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GRAY HERBARIUM
OF
HARVARD UNIVERSITY

GIFT OF
WALTER DEANE
OF CAMBRIDGE
CLASS OF 1870

2 Dec. 1918

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These two volumes contain all that Bailey has ever published on Carex to the date of the last publication, with the exception of Coulter's Rocky Mt. Flora, and Gray's Manual, 6th ed. & Pt. of Macmillan's Fl. of Canada.

W. Deane.
Nov. 1894.

Bailey has certified to this —

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Compliments of
L. H. Bailey, Jr.

GEOLOGICAL AND NATURAL HISTORY SURVEY OF MINNESOTA.
N. H. WINCHELL, STATE GEOLOGIST.

BULLETIN No. 3.

REPORT

ON

BOTANICAL WORK IN MINNESOTA

FOR THE YEAR 1886.

BY J. C. ARTHUR.
ASSISTED BY MR. WARREN UPHAM, PROF. L. H. BAILEY, JR.,
MR. E. W. D. HOLWAY, AND OTHERS.

DISTRIBUTED OCTOBER 1, 1887.

ST. PAUL:
PIONEER PRESS COMPANY.
1887.

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NARRATIVE.

The admirable collection of information on the flowering plants and vascular cryptogams, which Mr. Upham embodied in his *Catalogue of the Flora of Minnesota*, published in 1884, made available essentially all that was at that time procurable regarding the Minnesota flora, with the exception of a comparatively small amount pertaining to the lower cryptogams. Mr. Upham has brought this catalogue up to date in a supplement included in the present report.

Were botanical science stable and mature instead of changeable and growing, and could one always rely upon the determination of plants made by various observers, it would be only necessary to add to this excellent beginning such additional names as might be reported from time to time, until all the plants of the state had been enumerated, when a final revision would afford a complete flora. But such conditions do not exist, and the only satisfactory method of overcoming the sources of error accompanying the alternative, especially when the work extends through a number of years, as proposed for the Minnesota survey, is to provide a substantial basis in the form of a suitable herbarium, so that in the final enumeration a critical and comparative study of material actually in hand may serve to point out former mistakes, and enable the whole to be revised according to the latest developments of the science.

In more formally opening up the botanical work of the survey it is proposed, in accordance with these views, to emphasize at first two mutually supplementary features, the preservation of a herbarium to serve as a basis for study, and the systematic exploration of the less known parts of the state; at the same time data will be gathered, as far as possible, upon all questions of interest connected with the state flora, which will be embodied in reports as occasion requires. It is not intended to interrupt the general enumeration of plants already referred to, a part of the survey originated and prosecuted by Mr. Upham, with the co-operation of many local collectors, including several specially enthusiastic students of field botany.

The locality selected for exploration for the season of 1886 was Vermilion lake and vicinity, a region lying between the north shore of lake Superior and the International Boundry. The botanical party reached Vermilion lake July 17th, and went into

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camp with the geologists already on the spot, near the village of Tower. The endeavor had been to form a small party of specialists, who were adepts at collecting plants in general, and also able to exert unusual powers of observation toward certain groups, and thus insure more important results than could be hoped for from the ordinary collector. The survey was fortunate in securing the assistance of Professor L. H. Bailey, Jr., of the Agricultural College of Michigan, well known for his critical study of the difficult genus Carex, and of Mr. E. W. D. Holway, of Decorah, Iowa, an acute observer, and especially interested in the pyrenomycetous fungi and the slime moulds. These two and the writer, with the necessary assistants, spent nearly two weeks in botanical exploration of the region already indicated.

The camp was situated at the southern end of Vermilion lake, at about 48° north latitude, and daily excursions were made within a radius of some half a dozen miles from camp. On the twenty-third of the month the point was visited where the Iron Range railroad crosses the head waters of the St. Louis river, a distance southward of about thirty miles, and all plants gathered upon that excursion are marked accordingly. On the twenty-fourth Professor Bailey, with an assistant and an Indian guide, started on a five days' trip to the British boundary at Hunter's island. Collections were made at intermediate points, given in the catalogue as Mud river, Mud lake, Burntside lake, Long lake, Fall lake, and Basswood lake. Collections were also made, although not large ones, at Duluth and Two Harbors (Agate bay), on the north shore of lake Superior, both in going and coming.

The vegetation of this region appeared ample enough when looked at casually, but a systematic search showed a discouraging paucity of species, doubtless aggravated at the time of our stay by the rather severe drought which was prevailing. The lower plants were especially meagre, and none more so than the pileated fungi. Although but a few days were occupied in this exploration, yet so thorough was the search, that it is believed a large proportion of the flowering plants were secured and are included in the following list, some of them being necessarily gathered in fruit or only in leaf, with a fair showing also of the less conspicious part of the flora, the mosses, liverworts, fungi and algæ, including many microscopic plants.

The region has only been inhabited by Indians and hunters till about three years ago, when the opening of iron mines near the southern shore of Vermilion lake, and the construction of a

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railway from that point to the north shore of lake Superior for the transportation of ore, brought in many miners, shop-keepers and adventurers, and has built up the village of Tower to about a thousand inhabitants. The summer season is so short and uncertain that almost the only crop which can be safely grown is that of potatoes. Owing to the recent and limited settlement, and to the great restriction of agricultural operations, the introduced weeds of the region are necessarily few; careful attention was given to their collection, and the result is shown in the general list. It is worth mentioning that the introduced and cultivated plants were accompanied by their usual fungous parasites—abundance of Peronospora occurred upon Chenopodium album, and of Cystopus upon Amarantus retroflexus, while the small patches of very dwarf Indian corn bore quite as much Puccinia as usually prevails in a more congenial climate.

Other features of the flora of the region are mentioned by Professor Bailey in the following article.

SKETCH OF THE FLORA OF VERMILION LAKE AND VICINITY.

By L. H. Bailey, Jr.

In some respects the flora of this region is anomalous. In most of its features it differs little from that of central Michigan six degrees to the southward. This southern cast to the flora finds a ready explanation, however, in the fact that Vermilion lake is separated from the cooling influences of lake Superior by a degree of primeval forest. It is probably not so much the character of the winters as that of the summers which influences the distribution of plants in these latitudes. The snow must afford great protection to all vegetation at this place, and the summers, although short, are warm and the atmosphere is dry. All herbs of a more southern range find ample time to reach maturity, and the ligneous vegetation simply makes a smaller growth. This latter statement is confirmed by the small size of nearly all forest trees. Large sawing timber is not common. In an apparently primeval pine forest, we found few trees above eight or ten inches in diameter, and one measuring some six or seven inches was about a hundred years old. There are almost no distinctively northern or sub-boreal plants in the flora. The most conspicious ones are Rosa acicularis, Alnus viridis, Sparganium simplex var. fluitans, Salix balsamifera, Lycopodium

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annotinum var. pungens, Mertensia paniculata, Betula glandulosa, Vaccinium vitis-idæa and Carex vaginata. Even of these, Betula glandulosa and Vaccinium vitis-idæa were found on the St. Louis river nearly thirty miles south of Vermilion lake and more directly within the influence of lake Superior; and Alnus viridis was not observed south of Long lake, some miles northward, if we except its occurrence on the cliffs of lake Superior at Agate bay.

One of the most striking features of this flora is its monotony. Although the expedition has good reason to believe that it collected four-fifths of the flowering plants and vascular cryptogams common to the region, the collection from lake Superior to the International Boundary, did not much exceed 100 species. The flora of a similar area six degrees southwards would comprise from 1,000 to 1,200 species. Here is an illustration of the law that species decrease with the increase of latitude. I took pains to count the number of species growing upon given areas. Upon an area similar to that which would give from thirty to fifty species at Lansing, Mich., I counted from a dozen to twenty species. One of these areas, some four or more square rods, comprised the following:

Aspen — Populus tremuloides.
Birch — Betula papyrifera.
Willow — Salix rostrata.
Bush honeysuckle — Diervilla trifida.
Dogwood — Cornus stolonifera.
Bird cherry — Prunus pennsylvanica.
Epilobium — E. spicatum.
Plantain — Plantago major.
Strawberry — Fragaria virginiana, var. illinoensis.
Antennaria — A. plantaginifolia.
White clover — Trifolium repens.
Rush — Juncus tenuis.
Vetches — Lathyrus venosus and L. paluster.
Aster — A. paniculatus.
Carex — C. stipata.
Red-top — Agrostis vulgaris.
Brake — Pteris aquilina.

Moreover, most of these plants existed only as single specimens, and the character of the flora was determined by a half dozen species.

A few very rare or local plants were found, as follows:

Sparganium simplex, var. fluitans, abundant.

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Nuphar advena, var. minor, known heretofore only from Litchfield, N. Y.

Potamogeton obtusifolius.

Carex houghtonii, abundant.

Monotropa hypopitys.

Juncus stygius.

Aspidium fragrans, at Basswood lake.

Littorella lacustris, at Basswood lake, just inside the International Boundary.

To these may be added Carex pinguis *n. sp.*, (C. adusta, var. glomerata), C. arctata × flexilis (C. knieskernii), and Salix lucida var. serissima, *n. var.* This variety of Salix lucida occurs at Lansing, Mich., and Ithaca, New York.

The leading forest trees of the region are:

Red pine—Pinus resinosa.

Arbor vitæ—Thuya occidentalis.

White pine—Pinus strobus.

Balsam poplar—Populus balsamifera.

Aspen—P. tremuloides, more arboreal than I have ever seen it elsewhere.

Ashes—Fraxinus americana and F. pubescens, always small.

Sugar maple—Acer saccharinum, local.

Red and silver maples—A. rubrum and A. dasycarpum, rare and small.

Burr oak—Quercus macrocarpa, local and small.

Basswood—Tilia americana, not common.

Elm—Ulmus americana, not common.

Tamarack—Larix americana and

Black spruce—Abies nigra, are common everywhere in swamps.

Paper birch—Betula papyrifera, very abundant.

Yellow birch—Betula lutea, a single tree found midway between Vermilion lake and the International Boundary; it is rather common southwards toward Agate bay.

The fruits of the region are few, and mostly poor. The best are the blueberries, chiefly Vaccinium pennsylvanicum, which grow very large and are tender and aromatic. On Hunter's island, in the International chain, fruits of this plant often measured one and two-thirds inches in circumference and the plants were wonderfully productive. The true Fragaria virginiana is occasionally met with, and its fruits are always large and

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very sweet. Its var. illinoensis and F. vesca are more common, but their fruits, especially of the latter, are very poor. Various forms of the June-berry are esteemed by the Indians. The best of these forms, though not the commonest, is Amelanchier canadensis var. oligocarpa. This occurs nearer the Boundary. The small gooseberry, Ribes oxyacanthoides, occurs occasionally, but apparently is not abundant enough to furnish any considerable article of food. The dry, almost inedible fruits of a hawthorn (typical Cratægus tomentosa) are also eaten. The only members of the genus Prunus are the choke-cherry (*P. virginiana*) and the bird cherry (*P. pennsylvanica*). The fruits of the former are sometimes eaten. Red raspberries are abundant, even on Hunter's island. Black raspberries, blackberries and dewberries do not occur. Grapes are not found, and they appear to be entirely unknown to the Indians.

PLANTS COLLECTED BETWEEN LAKE SUPERIOR AND THE INTERNATIONAL BOUNARY, JULY, 1886.

By J. C. Arthur, L. H. Bailey, Jr. and E. W. D. Holway.

To facilitate the work of collecting each of the three members of the party devoted his chief attention to a particular part of the flora, and numbered his specimens consecutively as gathered, prefixing his initial. Each number in this list, therefore, represents a specimen deposited in the herbarium of the survey, bearing a corresponding number. This renders it possible to verify or revise the list at any time, by the use of the original material.

The catalogue comprises some 374 genera and about twice as many species, somewhat equally divided between the flowering and flowerless plants. There are observations and critical remarks appended to many of the species, and the following new species and varieties are described:

Anthostoma flavo-viride Ellis & Holway.
Boletus americanus Peck.
Carex pinguis Bailey.
Ciboria tabacina Ellis & Holway.
Nectria perforata Ellis & Holway.
Peziza borealis Ellis & Holway.
Peziza olivatra Ellis & Holway.
Puccinia haleniæ Arthur & Holway.
Puccinia ornata Arthur & Holway.
Ramularia variegata Ellis & Holway.

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Synchytrium asari Arthur & Holway.
Zygodesmus sublilacinus Ellis & Holway.
Boletus scaber Fr., var. **mutabilis** Peck.
Cosmarium speciosum Lund., var. **abbreviatum** Wolle.
Salix lucida Muhl., var. **serissima** Bailey.

Although the list does not conform to a uniform standard of classification, the arrangement of the classes and orders is approximately that which has most recently found favor with American systematists, while the genera and species are placed alphabetically in their respective groups, to facilitate reference. An index of genera will also assist in locating any particular genus.

Thanks are due to Professor Bailey and Mr. Holway for their energetic assistance in collecting, and for after work, by no means inconsiderable, in determining and arranging the material gathered. Acknowledgment is also due to the following eminent specialists for kindly determining or verifying specimens sent them, as stated at proper places in the list: Dr. Asa Gray, Dr. Sereno Watson, Prof. D. C. Eaton, Dr. W. J. Beal, Dr. John M. Coulter, Dr. Charles R. Barnes, Mr. Walter Deane, Rev. Thomas Morong, Mr. M. S. Bebb, Dr. Lucian M. Underwood, Mr. Henry Willey, Rev. Francis Wolle, Mr. J. B. Ellis, Mr. Charles H. Peck, Mr. B. W. Thomas, Dr. William Trelease and Dr. Geo. A. Rex.

PHANEROGAMIA.

RANUNCULACEÆ.

Actæa alba Bigel.—B 119, Vermilion lake.
Actæa spicata L., var. **rubra** Ait.—B 291, St. Louis river.
Anemone dichotoma L.—B 385, Mud lake.
Anemone virginiana L.—A 163, Vermilion lake.
Aquilegia canadensis L.—B 293, St. Louis river.
Coptis trifolia Salisb.—B 312, St. Louis river.
Ranunculus aquatilis L.—B 318, St. Louis river.
Ranunculus multifidus Pursh, var. **terrestris** Gr.—B 95*a*, Vermilion lake. Much reduced. (Determined by *Gray.*) B 441, Fall lake. Also much reduced, creeping in moist cool places.
Ranunculus pennsylvanicus L.f.—B 71, Vermilion lake.
Thalictrum purpurascens L.—A 68, A 158, Vermilion lake. (Determined by *Trelease.*) B 448, Mud lake. B 460, Agate bay.

NYMPHÆACEÆ.

Nuphar advena Ait., var. **minor** Morong.—B 93, Vermilion lake. (Determined by *Morong.*)

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Nuphar kalmianum Ait.—B 147, B 153, Vermilion lake. (Determined by *Morong.*)

Nymphæa tuberosa Paine.—B 138, Vermilion lake.

SARRACENIACEÆ.

Sarracenia purpurea L.—B 288, St. Louis river.

PAPAVERACEÆ.

Sanguinaria canadensis L.—A 157, Vermilion lake.

FUMARIACEÆ.

Corydalis aurea Willd.—B 508, Agate bay. High bluffs of the lake.

Corydalis glauca Pursh.—B 114, Vermilion lake. B 333, St. Louis river. The latter along the railroad track; appearing as if introduced.

CRUCIFERÆ.

Brassica campestris L.—B 279, St. Louis river. Near the railroad track.

Cardamine hirsuta L.—B 405, Burntside lake.

Lepidium intermedium Gr.—B 132, Vermilion lake. B 524, Agate bay.

VIOLACEÆ.

Viola blanda Willd.—B 455, Mud lake.

Viola blanda Willd., var. **palustriformis** Gr.—B 105, Vermilion lake.

Viola blanda Willd., var. **renifolia,** Gr.—B 382, Mud lake.

Viola pubescens Ait.—B 236, Vermilion lake.

Viola striata Ait. (?)—B 378, Mud lake.

CARYOPHYLLACEÆ.

Cerastium vulgatum L. (of Gray's Manual.)—B 472, Agate bay. But one specimen seen.

Saponaria vaccaria L.—B 336, St. Louis river. Along railroad track.

Stellaria longifolia Muhl.—B 102, Vermilion lake.

HYPERICACEÆ.

Elodia campanulata Pursh.—B 55, Vermilion lake.

Hypericum canadense L.—B 428, Long lake. (Determined by *Coulter.*)

TILIACEÆ.

Tilia americana L.—B 224, B 249, Vermilion lake.

GERANIACEÆ.

Geranium carolinianum L.—B 199, Vermilion lake.

Impatiens fulva Nutt.—A 7, B 118, Vermilion lake.

CELASTRACEÆ.

Celastrus scandens L.—B 235, Vermilion lake.

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RHAMNACEÆ.

Rhamnus alnifolia L'Her.—B 459, Mud lake.

SAPINDACEÆ.

Acer dasycarpum Ehrh.—B 109, Vermilion lake. Not very common.
Acer rubrum L.—B 186, Vermilion lake. Rare.
Acer saccharinum Wang.—B 225, Vermilion lake. Rare.
Acer spicatum Lam.—B 228, Vermilion lake.

ANACARDIACEÆ.

Rhus glabra L.—A 43, B 230, B 254, Vermilion lake. Flowering when a foot high.

LEGUMINOSÆ.

Lathyrus ochroleucus Hook.—A 63, B 187, Vermilion lake. The first with white flowers.
Lathyrus paluster L.—B 443, Long lake.
Lathyrus venosus Muhl.—B 186*a*, Vermilion lake.

ROSACEÆ.

Agrimonia eupatoria L.—A 164, B 191, Vermilion lake.
Amelanchier canadensis T. & G., var. **oligocarpa** T. & G.—B 407, Burntside lake. (Determined by *Watson.*)
Amelanchier canadensis T. & G., between var. rotundifolia *T. & G.* and var. botryapium *T. & G.*—B 2, B 487, Vermilion lake. (Determined by *Watson.*)
Cratægus coccinea L.—B 449, Mud lake.
Cratægus tomentosa L.—B 57, Vermilion lake. Type. (Determined by *Watson.*)
Fragaria vesca L.—B 45, Vermilion lake.
Fragaria virginiana Duch.—B 36. Vermilion lake.
Geum macrophyllum Willd.—B 253, Vermilion lake.
Geum rivale L.—A 67, Vermilion lake. B 350, Mud river.
Pirus americana DC.—B 315, St. Louis river.
Pirus sambucifolia C. & S.—B 18, B 22, Vermilion lake.
Potentilla fruticosa L.—B 495, Agate bay.
Potentilla norvegica L.—B 278, St. Louis river. Very large. B 469, Agate bay.
Potentilla palustris Scop.—B 142, Vermilion lake.
Potentilla pennsylvanica L.—B 512, Agate bay.
Potentilla tridentata Sol.—B 425, Fall lake. B 513, Agate bay.
Prunus pennsylvanica L.f.—B 169, Vermilion lake. B 351, Mud river.
Prunus virginiana L.—B 238, Vermilion lake. Not common. B 419, Long lake.
Rosa acicularis Lindl.—B 84, B 223, Vermilion lake. (Determined by *Watson.*)
Rosa arkansana Porter, var.—B 34, Vermilion lake. (Determined by *Watson.*

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Rosa sayi Porter—A 81, Agate bay. (Determined by *Watson.*)
Rubus hispidus L.—B 182, Vermilion lake.
Rubus nutkanus Moc.—B 518, Vermilion lake. High banks.
Rubus strigosus Michx.—B 170, Vermilion lake. Very abundant and fruitful.
Spiræa salicifolia L.—B 95, Vermilion lake.

SAXIFRAGACEÆ.

Heuchera hispida Pursh.—B 431, Basswood lake.
Mitella nuda L.—B 88, Vermilion lake. B 388, Mud lake.
Ribes floridum L'Her.—B 77, B 108, Vermilion lake.
Ribes prostratum L'Her.—B 94, Vermilion lake. B 506, Agate bay.
Ribes rubrum L.—B 115, B 222, Vermilion lake. B 454, Mud lake.
Saxifraga pennsylvanica L.—B 329, St. Louis river.

DROSERACEÆ.

Drosera rotundifolia L.—B 136, Vermilion lake.

HALORAGEÆ.

Hippurus vulgaris L.—B 134, Vermilion lake.
Myriophyllum verticillatum L.—B 368, Mud river.

ONAGRACEÆ.

Circæa alpina L.—H 28, B 207, Vermilion lake.
Epilobium coloratum Muhl.—B 157, Vermilion lake. B 461, B 516, Agate bay.
Epilobium palustre L., var. **lineare** Gr.—B 70, Vermilion lake. B 307, B 320, St. Louis river.
Epilobium spicatum Lam.—B 9, A 153, Vermilion lake. The latter with white flowers.
Œnothera biennis L.—B 260, Vermilion lake. B 502, Agate bay.

UMBELLIFERÆ.

Cicuta maculata L.—B 251, Vermilion lake.
Sanicula marylandica L.—B 216, Vermilion lake.
Sium cicutæfolium Gmel.—B 420, Long lake.

ARALIACEÆ.

Aralia hispida Vent.—A 47, Vermilion lake. B 341, St. Louis river.
Aralia nudicaulis L.—A 41, B 227, Vermilion lake.

CORNACEÆ.

Cornus canadensis L.—A 15, B 287, Vermilion lake.
Cornus circinata L'Her.—B 234, Vermilion lake.
Cornus stolonifera Michx.—B 12, B 250, Vermilion lake. Several specimens of Cornus were collected, which are evidently to be referred to this species, although they differ from all more southern forms with which I am acquainted, in several particulars. The leaves are mostly very broad, very white beneath, and the twigs are not conspicuously reddish. The berries are uniformly white. Cornus stolonifera is apparently a very complex species.—*Bailey.*

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CAPRIFOLIACEÆ.

Diervilla trifida Mœnch.—B 167, Vermilion lake.
Linnæa borealis Gron.—B 48, Vermilion lake.
Lonicera ciliata Muhl.—B 243, Vermilion lake.
Lonicera hirsuta Eaton.—B 61, B 123, Vermilion lake.
Lonicera oblongifolia Hook.—B 390, Vermilion lake.
Symphoricarpus racemosus Michx., var. **pauciflorus** Robbins.—B. 415, Burntside lake.
Viburnum opulus L.—A 174, Vermilion lake.
Viburnum pubescen sPursh.—B 62, Vermilion lake.

RUBIACEÆ.

Galium asprellum Michx.—A 72, Vermilion lake. B 356, Mud river.
Galium trifidum L.—A 10, B 73, Vermilion lake. B 275, B 297, St. Louis river.
Galium triflorum Michx.—B 44, B 210, Vermilion lake. In pine woods. B 330, St. Louis river. B 505, Agate bay.
Houstonia purpurea L., var. **longifolia** Gr.—B 474, Agate bay. Rocks.

COMPOSITÆ.

Achillea millefolium L.—B 159, Vermilion lake.
Adenocaulon bicolor Hook.—B 296, St. Louis river. Leaves only. (Determined by *Deane.*)
Anaphalis margaritacea B. & H.—B 160, Vermilion lake.
Antennaria plantaginifolia Hook.—B 218, Vermilion lake.
Aster azureus Lindl. (?)—B 507, Agate bay.
Aster longifolius Lam.—B 266, St. Louis river. (Determined by *Gray.*)
Aster macrophyllus L.—B 190, B 197, B 245, Vermilion lake. B 462, B 503, Agate bay.
Aster paniculatus Lam. (?)—B 217, Vermilion lake. Too young.
Aster ptarmicoides T. & G.—B 517, Agate bay. Rocks near the lake.
Aster sagittifolius Willd.—B 213, B 269, Vermilion lake. B 458, Mud lake. (Determined by *Gray.*)
Aster umbellatus Mill., var. **pubens** Gr.—B 198, A 66, Vermilion lake. B 337, St. Louis river. B 473, Agate bay.
Bidens beckii Torr.--B 541, Long lake.
Bidens frondosa L. (?)—B 72, Vermilion lake.
Cnicus muticus Pursh.—B 33, Vermilion lake.
Erigeron canadensis L.—B 271, St. Louis river.
Erigeron philadelphicus L.—A 65, B 285, Vermilion lake.
Erigeron strigosus Muhl.—B 161, Vermilion lake.
Eupatorium purpureum L.—A 64, Vermilion lake.
Helianthus giganteus L.—B 456, Mud lake.
Hieracium canadense Michx.—B 522, Agate bay.
Hieracium scabrum Michx.—A 166, Vermilion lake. B 308, St. Louis river.
Lactuca canadensis L.—B 196, Vermilion lake.
Lactuca leucophæa Gr.—B 457, Mud lake.

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Lactuca pulchella DC.—B 4, Vermilion lake.

Petasites palmata Gr.—B 310, St. Louis river. B 501, Agate bay. Dryish ground.

Prenanthes alba L.—B 399, Mud lake. B 481, Agate bay.

Rudbeckia hirta L.—B 303, near St. Louis river; along the railroad track.

Senecio aureus L., var. **balsamitæ** T. & G.—A 50, Vermilion lake.

Solidago bicolor L.—B 387, Mud lake. (Determined by *Gray.*)

Solidago canadensis L.—B 168, Vermilion lake. B 533, Mud lake.

Solidago juncea Ait.—B 31, Vermilion lake. (Determined by *Gray.*)

Solidago lanceolata L.—B 255, Vermilion lake.

Solidago uliginosa Nutt. (?)—B 470, Agate bay. Immature.

LOBELIACEÆ.

Lobelia dortmanna L.—B 537, Burntside lake.

Lobelia kalmii L.—B 479, Agate bay. Flowers sometimes white.

CAMPANULACEÆ.

Campanula aparinoides Pursh.—B 110, Vermilion lake. B 272, B 321, St. Louis river.

Campanula rotundifolia L.—B 475, Agate bay.

ERICACEÆ.

Andromeda polifolia L.—B 280, Vermilion lake. B 295, St. Louis river.

Cassandra calyculata Don.—B 258, Vermilion lake.

Chimaphila umbellata Nutt.—B 189, Vermilion lake. B 416, Long lake.

Gaultheria procumbens L.—B 174, Vermilion lake.

Kalmia glauca Ait.—B 201, Vermilion lake.

Ledum latifolium Ait.—B 257, Vermilion lake.

Moneses uniflora Gr.—A 161, Vermilion lake. B 379, Mud lake.

Monotropa hypopitys L.—B 239, Vermilion lake.

Monotropa uniflora L.—B 156, Vermilion lake.

Pyrola chlorantha Swz.—B 173, Vermilion lake. A form with leaves very short petioled.

Pyrola rotundifolia L., var. **asarifolia** Hook.—A 42, Vermilion lake.

Pyrola secunda L.—A 14, B 78, B 166, Vermilion lake.

Vaccinium canadense Kalm.—B 141, Vermilion lake.

Vaccinium oxycoccus L.—B 332, St. Louis river.

Vaccinium pennsylvanicum Lam.—B 178, Vermilion lake. B 453, Mud lake. A form growing a foot high in crevices of rocks, and bearing good *black* berries which have a very light bloom.

Vaccinium vitis-idæa L.—B 299, St. Louis river.

PRIMULACEÆ.

Lysimachia stricta Ait.—B 11, Vermilion lake. B 463, Agate bay.

Lysimachia thyrsiflora L.—B 421, Long lake.

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Primula mistassinica Michx.—B 477, Agate bay.
Steironema ciliatum Raf.—A 71, Vermilion lake.
Trientalis americana Pursh.—B 244, Vermilion lake.

OLEACEÆ.

Fraxinus pubescens Lam.—B 56, B 58, Vermilion lake.
Fraxinus sambucifolia Lam.—B 340, St. Louis river.
Fraxinus viridis Michx. f.—B 117, Vermilion lake.

APOCYNACEÆ.

Apocynum androsæmifolium L.—B 131, B 185, Vermilion lake. The latter with flowers striped with red.
Apocynum cannabinum L.—B 214, Vermilion lake.

GENTIANACEÆ.

Gentiana andrewsii Griseb.—B 355, Mud river.
Halenia deflexa Griseb.—A 51, B 192, Vermilion lake. B 191, Agate bay.
Menyanthes trifoliata L.—B 282, St. Louis river.

BORRAGINACEÆ.

Echinospermum ——?—B 248, Vermilion lake.
Mertensia paniculata Don.—B 268, Vermilion lake.

CONVOLVULACEÆ.

Cuscuta gronovii Willd.—B 180, Vermilion lake. On Epilobium spicatum.

SOLANACEÆ.

Physalis grandiflora Hook.—B 242, Vermilion lake.

SCROPHULARIACEÆ.

Castilleia coccinea Spreng.—B 302, St. Louis river. Rare.
Chelone glabra L.—B 327, St. Louis river.
Euphrasia officinalis L.—B 485, Agate bay. On rocks by the lake.
Melampyrum americanum Michx.—B 193, Vermilion lake.
Mimulus ringens L.—B 111, Vermilion lake.
Veronica scutellata L.—B 99, Vermilion lake.

LENTIBULARIACEÆ.

Pinguicula vulgaris L.—B 478, Agate bay.
Utricularia vulgaris L.—A 62, B 75, B 146, Vermilion lake.

LABIATÆ.

Brunella vulgaris L.—B 188, Vermilion lake.
Calamintha clinopodium Benth.—B 59, Vermilion lake.
Dracocephalum parviflorum Nutt.—B 53, Vermilion lake.
Lophanthus anisatus Benth.—B 49, Vermilion lake.

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Mentha canadensis L. — B 3, Vermilion lake.
Scutellaria galericulata L. — B 76, Vermilion lake.
Scutellaria lateriflora L. — B 52, Vermilion lake.
Stachys aspera Michx. — B 14, Vermilion lake.

PLANTAGINACEÆ.

Littorella lacustris L. — B 437, Basswood lake.
Plantago major L. — B 258*a*, St. Louis river.

CHENOPODIACEÆ.

Chenopodium album L.— B 523, Agate bay.
Chenopodium hybridum L. — B 54, B 241, Vermilion lake.

POLYGONACEÆ.

Polygonum acre HBK. — B 370, Mud river.
Polygonum dumetorum L., var. **scandens** Gr. — B 51, Vermilion lake.
Polygonum hartwrightii Gr. — B 417, Long lake.
Polygonum muhlenbergii Wats. — B 366, Mud river.
Rumex acetosella L. — B 544, Mud lake. In a cold swamp by a trail; but one specimen found on the whole journey.
Rumex britannicus L. (*R. orbiculatus*, Gr.) — B 328, St. Louis river.
Rumex crispus L. — B 204, Vermilion lake. Near an Indian settlement.
Rumex salicifolius Weinm. — B 1, Vermilion lake.

ARISTOLOCHIACEÆ.

Asarum canadense L. — A 159, Vermilion lake.

CALLITRICHACEÆ.

Callitriche verna L. — B 367, Mud river. B 400, Mud lake.

URTICACEÆ.

Ulmus fulva Michx. — B 237, Vermilion lake.
Urtica gracilis Ait. — B 267, Vermilion lake. Rare.

MYRICACEÆ.

Comptonia asplenifolia Ait. — B 409, Burntside lake.
Myrica gale L. — B 13, Vermilion lake.

BETULACEÆ.

Alnus incana Willd. — B 152, Vermilion lake.
Alnus viridis DC. — B 445, Long lake. B 515, Agate bay.
Betula glandulosa Michx. — B 300, St. Louis river.
Betula lutea Michx. f. — B 552, Fall lake.

CUPULIFERÆ.

Corylus rostrata Ait. — B 229, Vermilion lake.
Ostrya virginica Willd. — B 232, Vermilion lake.
Quercus macrocarpa Michx. — B 534. Mud lake.

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SALICACEÆ.

Populus balsamifera L. — B 162, Vermilion lake. Common.

Populus tremuloides Michx. — B 158, Vermilion lake.

Salix balsamifera Bar. — B 16, B 140, Vermilion lake. B 480, Agate bay. (Determined by *Bebb.*)

Salix candida Willd. — B 360, Mud river. B 392, Mud lake. (Determined by *Bebb.*)

Salix humilis Muhl. — B 130, B 221, B 286, Vermilion lake. B 408, Burntside lake. (Determined by *Bebb.*)

Salix lucida Muhl. — B 358, Mud river. (Determined by *Bebb.*)

Salix lucida Muhl., var. **serissima** Bailey (*n. var.*). Differs from the species in fruiting very late. It occurs at Lansing, Mich., where its fruit matures in September, assuming a bright red color in the sun. It is one of the most ornamental of the willows. B 357, Mud river; in fruit.

Salix myrtilloides L. — B 317, St. Louis river. (Determined by *Bebb.*)

Salix myrtilloides L., var. **pedicellaris** Carey. — B 137, Vermilion lake. (Determined by *Bebb.*)

Salix petiolaris Smith. — B 359, Mud river. (Determined by *Bebb.*)

Salix petiolaris Smith, var. **gracilis** And. — B 143, Vermilion lake. B 361, Mud river. (Determined by *Bebb.*)

Salix petiolaris × candida — B 362, B 363, B 364, Mud river. (Determined by *Bebb.*)

Salix rostrata Rich. — B 212, B 284, Vermilion lake. Growing fifteen feet high. B 334, St. Louis river. (Determined by *Bebb.*)

Salix ——? — B 365, Mud river.

ORCHIDACEÆ.

Corallorhiza innata R. Br. — B 89, B 247, Vermilion lake.

Corallorhiza multiflora Nutt. — A 48, Vermilion lake.

Goodyera repens R. Br. — H 29, B 177, Vermilion lake. B 304, St. Louis river. B 373, Mud lake.

Habenaria dilatata Gr. — B 290, B 324, St. Louis river.

Habenaria hookeri Torr. — B 194, Vermilion lake.

Habenaria hyperborea R. Br. — A 18, B 43, Vermilion lake. B 384, Mud lake.

Habenaria obtusata Rich. — A 160, Vermilion lake. B 380, Mud lake.

Habenaria orbiculata Torr. — H 31, Vermilion lake. B 377, Mud lake. B 560, St. Louis river.

Habenaria psycodes Gr. — B 429, Fall lake.

Orchis rotundifolia Pursh. — B 433, Basswood lake.

Spiranthes cernua Rich. — B 354, Mud river. B 444, Long lake. B 559, Vermilion lake.

Spiranthes gracilis Bigel. — B 15, B 181, Vermilion lake.

IRIDACEÆ.

Iris versicolor L. — B 220, Vermilion lake.

Sisyrinchium mucronatum Michx. — B 435, Basswood lake. B 493 Agate bay.

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LILIACEÆ.

Clintonia borealis Raf.—A 46, B 120, Vermilion lake.
Lilium philadelphicum L.—B 386, Mud lake.
Maianthemum canadense Desf.—B 246, Vermilion lake.
Smilacina trifolia Desf.—B 289, St. Louis river.
Streptopus roseus Michx.—B 208, Vermilion lake.
Trillium erectum L., var. **declinatum** Gr.—A 103, B 231, Vermilion lake.
Uvularia grandiflora Smith.—B 223, Vermilion lake.

JUNCACEÆ.

Juncus articulatus L.—B 322, St. Louis river. B 374, Mud lake. B 483, Agate bay.
Juncus canadensis J. Gay.—B 276, Vermilion lake.
Juncus effusus L.—B 520, Agate bay.
Juncus filiformis L.—B 17, Vermilion lake.
Juncus pelocarpus E. Meyer.—B 438, Basswood lake.
Juncus stygius L.—B 314, St. Louis river. Rare.
Juncus tenuis Willd.—B 125, Vermilion lake.
Juncus ———?—B 468, B 486, Agate bay.
Luzula pilosa Willd.—B 383, B 401, Mud lake.

TYPHACEÆ.

Sparganium simplex Huds., var. **fluitans** Gr.—B 85, Vermilion lake.
Sparganium simplex Huds., var. **nuttallii** Gr.; nearly.—B 179, Vermilion lake.

ARACEÆ.

Acorus calamus L.—B 50, Vermilion lake.
Arisæma triphyllum Torr.—A 156, Vermilion lake.
Calla palustris L.—B 98, Vermilion lake.

ALISMACEÆ.

Sagittaria heterophylla Pursh.—B 542, Long lake. (Determined by *Watson.*)
Sagittaria variabilis Eng.—B 154, Vermilion lake. Leaves floating.
Sagittaria variabilis Eng , var. **angustifolia** Eng.—B 151, Vermilion lake.

NAIADACEÆ.

Naias flexilis R. & S.—B 389, Mud lake.
Potamogeton claytonii Tuck.—B 410, Burntside lake. B 540, B 546, B 550, Long lake. (Determined by *Morong.*)
Potamogeton gramineus L.—B 46, Vermilion lake. (Determined by *Morong.*)
Potamogeton gramineus L., var. **maximus** Morong.—B 69, Vermilion lake. B 403 in part, Burntside lake. (Determined by *Morong.*)
Potamogeton gramineus L., var. **elongatus** Morong.—B 447, B 448, B 449, Long lake. (Determined by *Morong.*)

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Potamogeton mucronatus Schrad.—B 369, Mud river. A slender form. (Determined by *Morong.*)

Potamogeton natans L.—B 86, Vermilion lake. B 391, Mud lake. (Determined by *Morong.*)

Potamogeton obtusifolius M. & K.—B 155, Vermilion lake. (Determined by *Morong.*)

Potamogeton pectinatus L.—B 124, Vermilion lake. (Determined by *Morong.*)

Potamogeton perfoliatus L., var. **lanceolatus** Rob.—B 47, B 149, Vermilion lake. (Determined by *Morong.*)

Potamogeton prælongus Wulf.—B 404, Burntside lake. (Determined by *Morong.*)

Potamogeton pusillus L. (?)—B 394, Mud lake. (Determined by *Morong.*)

Potamogeton pusillus L., var **tenuissimus** M. & K.—B 538, Long lake. (Determined by *Morong.*)

Potamogeton robbinsii Oakes.—B 393, Mud lake. B 442, Fall lake. The latter in fruit! (Determined by *Morong.*)

Potamogeton rufescens Schrad.—B 402, Burntside lake. B 551, Mud lake. (Determined by *Morong.*)

Potamogeton spirillus Tuck.—B 414, B 539, Long lake. (Determined by *Morong.*)

Potamogeton zosterifolius Schum.—B 403 in part, Burntside lake. B 545, Long lake. (Determined by *Morong.*)

Scheuchzeria palustris L.—B 305, St. Louis river.

Triglochin maritimum L.—B 326, St. Louis river.

ERIOCAULONACEÆ.

Eriocaulon septangulare With.—B 536, Burntside lake.

CYPERACEÆ.

Carex adusta Boott.—B 7, Vermilion lake. B 283, St. Louis river. B 558, Long lake. B 464, B 526, B 531, Agate bay.

Carex aquatilis Wahl.—B 145, Vermilion lake.

Carex arctata Boott.—B 211, Vermilion lake. B 556, Mud lake.

Carex arctata × **flexilis** Bailey.—B 554, B 555, Long lake. See *Bot. Gazette*, vol. XI, 1886, p. 328, for a description and illustration of this hybrid.

Carex arctata × **flexilis** or **arctata** × **vaginata.**—B 375, Mud lake.

Carex aurea Nutt.—H 30, Vermilion lake.

Carex buxbaumii Wahl.—B 471, Agate bay.

Carex canescens L., var. **polystachya** Boott.—B 74, B 100, Vermilion lake.

Carex crinita Lam.—B 107, Vermilion lake.

Carex deweyana Schw.—B 37, Vermilion lake.

Carex echinata Murr., var. **microstachys** B.—B 482, Agate bay.

Carex filiformis L.—B 200, Vermilion lake.

Carex flexilis Rudge.—B 557, Long lake.

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Carex houghtonii Torr.—B 206, Vermilion lake. Abundant. B 509, Agate bay.

Carex intumescens Rudge.—B 68, Vermilion lake.

Carex laxiflora Lam., var. **intermedia** Boott.—B 116, Vermilion lake. B 335, St. Louis river.

Carex lenticularis Michx.—B 406, Burntside lake; in water. B 465 Agate bay.

Carex limosa L.—B 294, St. Louis river.

Carex magellanica Lam.—B 90, Vermilion lake. B 298, St. Louis river.

Carex monile Tuck.—B 274, St. Louis river. B 423, Fall lake.

Carex pauciflora Lightf.—B 203, Vermilion lake.

Carex pinguis Bailey (*n. sp.*). (*C. adusta* Boott, var. *glomerata* Bailey.) I collected this sedge in quantity in several places, and observed its habits. It appears to be specifically distinct from *C. adusta*. From that species it differs in its stiff culm, dense broad head of which some spikes, or at least the lowest one, are subtended by a short and very broad-based, nerved and pointed bract, and very plump perigynium which is nearly filled by the achenium, flat or convex and nerveless or very nearly so on the inner face, wingless or slightly margined above. It grows in dense tufts in dry soil. Slender and immature specimens strongly resemble *C. adusta*, but they are always readily distinguished by the perigynium.—B 6, Vermilion lake. B 325, St. Louis river. B 530, Agate bay.

Carex polytrichoides Muhl.—B 29, Vermilion lake. B 316, St. Louis river.

Carex retrorsa Schw.—B 67, B 101, Vermilion lake.

Carex rostrata With.—B 144, Vermilion lake.

Carex rostrata With., var. **utriculata** Bailey.—B 112, Vermilion lake.

Carex scoparia Schk.—B 8, B 60, Vermilion lake; the latter a conglomerate form. B 301, St. Louis river. B 466, B 492, Agate bay; a small form.

Carex stipata Muhl.—B 521, Agate bay.

Carex straminea Schk., var. **mirabilis** Tuck.; nearly.—B 41, Vermilion lake.

Carex tenella Schk.—B 30, Vermilion lake.

Carex tenuiflora Wahl.—B 281, St. Louis river. Slender form.

Carex tribuloides Wahl., var. **cristata** Bailey.—B 259, Vermilion lake.

Carex tribuloides Wahl., var. **reducta** Bailey,—B 35, B 92, B 184, Vermilion lake. B 418, Long lake; not quite typical. B 525, Agate bay.

Carex tribuloides Wahl., between vars. cristata and reducta.—B 270, Vermilion lake.

Carex trisperma Dew.—B 91, Vermilion lake.

Carex tuckermani Boott.—B 104, Vermilion lake.

Carex vaginata Tausch.—B 352, Mud river. B 543, Long lake.

Eleocharis acicularis R. Br.—B 150, Vermilion lake.

Eleocharis palustris R. Br.—B 19, Vermilion lake. B 535, Long lake.

Eleocharis pygmæa Torr.—B 149, Vermilion lake.

Eriophorum polystachyon L.—B 202, Vermilion lake.

Rhynchospora alba Vahl.—B 319, St. Louis river.

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Scirpus cæspitosus L.—B 467, Agate bay. Growing in crevices of rocks.
Scirpus eriophorum Michx.—B 164, Vermilion lake.
Scirpus fluviatilis Gr.—B 21, Vermilion lake.
Scirpus lacustris L.—B 219, Vermilion lake.
Scirpus subterminalis Torr.—B 412, Burntside lake.

GRAMINEÆ.

The grasses determined by Dr. W. J. Beal.

Agropyrum caninum R. & S.—B 42, Vermilion lake.
Agropyrum repens L.—B 511, Agate bay.
Agropyrum violaceum Lange.—B 494, Agate bay.
Agrostis alba L.—B 127, Vermilion lake.
Agrostis scabra Willd.—B 129, Vermilion lake.
Brachyelytrum aristatum P. B.—B 397, Mud lake.
Bromus ciliatus L.—B 5, Vermilion lake.
Cinna pendula Trin.—B 323, St. Louis river.
Deschampsia cæspitosa P. B.—B 424, Fall lake.
Deyeuxia canadensis Hook—B 10, B 256, Vermilion lake. B 529, Agate bay.
Deyeuxia langsdorffi Kunth.—B 519, Agate bay.
Eatonia pennsylvanica Gr.—B 32, Vermilion lake.
Elymus virginicus L.—B 265, St. Louis river.
Festuca ovina L.—B 450, Mud lake.
Festuca ovina L., var.—B 489, Agate bay.
Glyceria arundinacea Kunth.—B 97, B 263, Vermilion lake.
Glyceria canadensis Trin.—B 264, B 273, Vermilion lake.
Glyceria fluitans R. Br.—B 20, Vermilian lake.
Glyceria nervata Trin.—B 103, Vermilion lake. B 349, Mud river.
Hierochloa borealis R. & S.—B 451, Long lake.
Hordeum jubatum L.—B 128, Vermilion lake.
Muhlenbergia mexicana Trin.—B 422, Long lake.
Phalaris arundinacea L.—B 446, Mud river.
Phalaris canariensis L.—B 528, Two Harbors; in the town.
Phleum pratense L.—B 292, St. Louis river. Scattered from the railroad.
Poa cæsia Sm., var. **strictior** Gr.—B 469, B 514, Agate bay.
Poa compressa L.—B 527, Agate bay.
Poa lævis Vasey.—B 439, Basswood lake.
Poa nemoralis L.—B 183, Vermilion lake. Along a trail in woods. B 426, Fall lake. B 434, Basswood lake.
Poa pratensis L.—B 488, Agate bay. Tall and slender form.
Poa serotina Ehrh.—B 510, Agate bay.
Trisetum subspicatum P. B., var. **molle** Gr.—B 490, Agate bay.

CONIFERÆ.

Juniperus communis L.—B 411, Burntside lake.
Picea nigra Link.—B 171, Vermilion lake.
Pinus resinosa Ait.—B 96, Vermilion lake.
Pinus strobus L.—B 240, Vermilion lake.

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Taxus baccata L., var. **canadensis** Gr. — B 165, Vermilion lake.

Thuya occidentalis L. — B 83, B 133, Vermilion lake. B 381, Mud lake; seedlings.

PTERIDOPHYTA.

ISOETÆ.

Isoetes echinospora Durieu, var. **braunii** Engelm. — B 81, Vermilion lake. Submerged on stones. B 413, Long lake. (Determined by *Watson.*)

SELAGINELLEÆ.

Selaginella rupestris Spring. — A 171, Duluth. On rocks. B 447, Mud lake.

LYCOPODIACEÆ.

Lycopodium annotinum L. — A 162, Vermilion lake. B 311, St. Louis river.

Lycopodium annotinum L., var. **pungens** Desv. — B 135, Vermilion lake.

Lycopodium clavatum L. — A 31, A 98, Vermilion lake.

Lycopodium complanatum L. — A 99, Vermilion lake.

Lycopodium dendroideum Michx. — A 40, Vermilion lake.

Lycopodium lucidulum Michx. — B 309, St. Louis river.

OPHIOGLOSSACEÆ.

Botrychium virginianum Swz. — B 38, Vermilion lake.

FILICES.

Aspidium cristatum Swz. — A 155, Vermilion lake. B 353, Mud river.

Aspidium fragrans Swz. — B 430, Basswood lake. Growing on rocks.

Aspidium spinulosum Swz. — B 106, Vermilion lake. B 432, Basswood lake. B 440, Fall lake.

Aspidium spinulosum Swz., var. **intermedium** Eaton. — B 252, Vermilion lake.

Asplenium filix-fœmina Bernh. — A 152, A 163, Vermilion lake. B 339, St. Louis river. B 396, Mud lake. B 553, Fall lake; an aberrant form. (The last determined by *Eaton.*)

Onoclea sensibilis L. — A 154, Vermilion lake.

Onoclea struthiopteris Hoffm. — A 165, Vermilion lake.

Osmunda claytoniana L. — B 175, Vermilion lake.

Osmunda regalis L. — B 338, St. Louis river.

Phegopteris dryopteris Fee. — A 32, Vermilion lake. B 398, Mud lake.

Phegopteris polypodioides Fee. — B 209, Vermilion lake. B 436, Basswood lake. B 504, Agate bay.

Polypodium vulgare L. — B 176, Vermilion lake.

Pteris aquilina L. — B 215, Vermilion lake.

Woodsia ilvensis R. Br. — A 151, Duluth. B 452, Long lake. B 476, B 484, Agate bay.

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EQUISETACEÆ.

Equisetum arvense L.—B 172, B 262, Vermilion lake. Common; the latter is the var. *serotinum* Meyer.

Equisetum limosum L.—B 139, Vermilion lake.

Equisetum sylvaticum L.—B 28, B 261, Vermilion lake. Common.

BRYOPHYTA.

The mosses determined by Dr. Charles R. Barnes, the liverworts by Dr. Lucian M. Underwood.

SPHAGNACEÆ.

Sphagnum acutifolium Ehrh.—A 11, A 33, A 59, A 61, A 60, Vermilion lake. The last is near var. *fuscum* Schimper.

Sphagnum cymbifolium Ehrh.—A 13, Vermilion lake.

Sphagnum squarrosum Pers.—A 12, A 36, Vermilion lake.

BRYACEÆ.

Atrichum undulatum Beauv.—A 96, Vermilion lake. Not common.

Aulacomnium palustre Schwag.—B 25, Vermilion lake.

Bryum argenteum L.—B 500, Agate bay,

Bryum bimum Schreb.—A 5 in part (?), B 23 (?), Vermilion lake. B 427, Fall lake.

Bryum intermedium Brid.—A 2, Vermilion lake.

Ceratodon purpureus Brid.—B 80, Vermilion lake, B 499, Agate bay.

Climacium dendroides W. & M.—A 21, Vermilion lake.

Dicranum drummondii Muller.—B 24, Vermilion lake.

Dicranum flagellare Hedw.—A 95, Vermilion lake.

Dicranum scoparium Hedw.—B 346, St. Louis river.

Dicranum undulatum Turn.—A 102, Vermilion lake. B 306, St. Louis river.

Fontinalis lescurii Sull., var. **gracilescens** Sull.—A 30, B 82, Vermilion lake.

Funaria hygrometrica Sibth.—B 121, Vermilion lake. A 146, B 343, St. Louis river.

Hypnum crista-castrensis L.—A 91, Vermilion lake. A 128, B 313, St. Louis river.

Leptobryum pyriforme Schimp.—B 26, Vermilion lake. A 147 in part, B 342, St. Louis river.

Leucobryum vulgare Hampe.—A 127, St. Louis river.

Mnium affine Bland.—B 372, Mud lake.

Mnium cinclidioides Hub.—A 3, Vermilion lake. This species has not been heretofore recorded as occurring outside of New England.

Mnium cuspidatum Hedw.—A 113, A 116, Vermilion lake.

Mnium punctatum Hedw.—A 177, Vermilion lake.

Mnium serratum Laich.—A 5 in part, Vermilion lake.

Neckera oligocarpa Br. & Schr.—A 35, Vermilion lake. Beautiful fruiting specimens of this rather rare species, which is recorded only from the White mountains, Colorado and New Mexico. The plants form numerous shelf-like projections from the tree trunks.

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Orthotrichum strangulatum Beauv.—A 8, A 117, Vermilion lake. The first is a form in which the capsule is not strangulate or ribbed when dry; otherwise identical with A 117, which is typical.

Philonotis fontana Brid.—B 497, B 498 (male), Agate bay.

Polytrichum commune L.—A 81, A 129, Vermilion lake. The latter varies from the type.

Polytrichum juniperinum Willd.—B 345 in part, St. Louis river.

Polytrichum piliferum Schreb.—A 143, Duluth. On exposed rocks.

Pylaisæa intricata Br. & Schr.—A 39, Vermilion lake.

Tetraphis pellucida Hedw.—A 178, A 179, Vermilion lake.

Webera nutans Hedw.—A 16, Vermilion lake.

MARCHANTIACEÆ.

Conocephalus conicus Dum.—A 100, Vermilion lake. Sterile.

Marchantia polymorpha L.—A 69, B 113, Vermilion lake. Very common.

JUNGERMANIACEÆ.

Blepharostoma trichophylla Dum.—A 126 in part, St. Louis river.

Blepharozia ciliaris Dum.—A 70, Vermilion lake.

Frullania eboracensis Got.—A 29, A 44, Vermilion lake.

Jungermania inflata Huds.—A 126 in part, St. Louis river. On rotten logs.

Jungermania schraderi Mart.—A 126 in part, St. Louis river.

Madotheca platyphylla Dum.—A 114, Vermilion lake. On tree trunks.

Pellia epiphylla Nees.—A 175, Vermilion lake. Sterile.

CARPOPHYTA.

HYMENOMYCETES.

Agaricus (Amanita) **muscarius** L.—A 135, Vermilion lake. (Determined by *Peck.*)

Agaricus (Collybia) **confluens** Pers.—A 74, A 195, Vermilion lake. (Determined by *Peck.*)

Agaricus (Inocybe) **eutheles** B. & Br.—A 185, Vermilion lake. (Determined by *Peck.*)

Agaricus (Omphalia) **campanella** Batsch.—A 55, A 75, A 173, Vermilion lake. (Determined by *Peck.*)

Agaricus (Omphalia) **gracillimus** Weinm.—A 194, Vermilion lake. (Determined by *Peck.*)

Agaricus (Pholiota) **squarrosus** Mull. (?)—A 140, Vermilion lake. Not mature. (Determined by *Peck.*)

Agaricus (Pleurotus) **sapidus** Kalchb.—A 110, Vermilion lake. A very small specimen. (Determined by *Peck.*)

Agaricus (Pluteus) **cervinus** Schœff.—A 150, Vermilion lake. (Determined by *Peck.*)

Agaricus (Pluteus) **nanus** Pers.—A 111, A 119, Vermilion lake. Determined by *Peck.*)

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Boletus americanus Peck, *ined.*—A. 182, Vermilion lake. "This has generally been referred to *B. flavidus* Fr., but my more recent investigations lead me to believe it is distinct."—*Chas. H. Peck.*

Boletus granulatus L.—A. 125, Vermilion lake. (Determined by *Peck.*)

Boletus scaber Fr.—A 139, Vermilion lake. (Determined by *Peck.*)

Boletus scaber Fr., var. **mutabilis** Peck, *ined.*—A 120, Vermilion lake. "The change of color in the flesh on exposure to the air leads me to separate this as a variety; I detect no other essential difference."—*Chas. H. Peck.*

Cantharellus cibarius Fr.—A 108, Vermilion lake. (Determined by *Peck.*)

Clavaria flaccida Fr.—H 82, Vermilion lake. On rotten logs. (Determined by *Ellis.*)

Clavaria ligula Schaff.—B 373*a*, Mud lake. (Determined by *Ellis.*)

Corticium amorphum (Pers.) Wint. (*Aleurodiscus amorphus* Rabh.)—H 180, St. Louis river. On tamarack. (Determined by *Ellis.*)

Corticium corrugatum Fr. (*Hymenochæte corrugata* Berk.)—H 158, Vermilion lake.

Corticium epichlorium B. & C.—H 155, Vermilion lake. (Determined by *Ellis & Cooke.*)

Corticium giganteum Fr.—H 175, Vermilion lake. On tamarack.

Corticium ochroleucium Fr., var. **spumeum** B. & R.—H 138, Vermilion lake. On logs.

Corticium salicinum Fr.—H 42, Vermilion lake. On Salix discolor.

Cyphella fulva B. & Rav.—H 226, Vermilion lake. On dead limbs of Alnus.

Dædalea unicolor Fr.—H 201, Vermilion lake.

Favolus europæus Fr.—H 142, Vermilion lake.

Glæoporus conchoides Mont.—H 257, Vermilion lake. On logs.

Hygrophorus cantharellus Schw.—A 73, Vermilion lake. (Determined by *Peck.*)

Hydnum adustum Schw.—H 263, Vermilion lake. (Determined by *Ellis.*)

Hydnum auriscalpium L.—H 196, St. Louis river. In swamps. (Determined by *Ellis.*)

Hydnum caryophylleum B. & C.—H 252, Vermilion lake. On poplar log.

Hydnum ferruginosum Fr.—H 87, Vermilion lake. On rotten log. (Determined by *Ellis.*)

Hydnum membranaceum Bull.—H 184, Vermilion lake.

Irpex tulipifera Schw.—H 239, Vermilion lake.

Lactarius pyrogalus Fr. (?)—A 107, Vermilion lake. No note was made at the time of collection of the presence or absence of a milky juice, which necessarily leaves some doubt about the determination. (Determined by *Peck.*)

Lentinus betulina Fr.—H 132, Vermilion lake. On stumps.

Lentinus lecontei Fr.—H 106. Vermilion lake. On logs.

Lentinus lepideus Fr.—A 53, Vermilion lake. (Determined by *Peck.*)

Lentinus strigosus Schw.—A 106, A 124, Vermilion lake. (Determined by *Peck.*)

Lenzites sæpiaria Fr.—H 80, Vermilion lake. On dead Abies alba.

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Lenzites sæpiaria Fr., var. **porosa** Pk.—H 73, Vermilion lake. On log of Abies. (Determined by *Ellis.*)

Marasmius ———?—H 65, Vermilion lake. In swamps. Appears to be undescribed, *fide* Ellis, but the material too scant for description.

Merulius aureus Fr.—H 204, Vermilion lake. On old log.

Odontia fimbriata Pers.—H 147, Vermilion lake. On fallen limbs.

Panus lævis B. & C.—A 141, Vermilion lake. (Determined by *Peck.*)

Phlebia merismoides Fr.—H 249, Vermilion lake. On logs. (Determined by *Ellis.*)

Phlebia spilomea B & C.—H 104, H 250, Vermilion lake. On Populus tremuloides.

Polyporus abietinus Fr.—H 79, Vermilion lake. Resupinate form. On log of fir. (Determined by *Ellis.*)

Polyporus applanatus Fr.—H 238, Vermilion lake. On logs.

Polyporus carneus Nees.—H 172, Vermilion lake. On logs; common. (Determined by *Ellis.*)

Polyporus conchatus Fr.—H 211, Vermilion lake. On logs.

Polyporus fomentarius Fr.—H 255, Vermilion lake. On birch.

Polyporus igniarius Fr.—H 237, Vermilion lake. On birch.

Polyporus loricatus Pers., var.—H 221, Vermilion lake.

Polyporus nitidus Fr.—H 203, Vermilion lake.

Polyporus perennis Fr.—H 66, Vermilion lake. On the ground.

Polyporus pergamenus Fr.—H 183, St. Louis river. On birch.

Polyporus picipes Fr.—H 220, Vermilion lake. On logs.

Polyporus pinacola Fr.—H 91, Vermilion lake. On pine logs. (Determined by *Ellis.*)

Polyporus schweinizii Fr.—A 138, St. Louis river. (Determined by *Peck.*)

Polyporus scutellatus Schw.—H 219, Vermilion lake. On Alnus.

Polyporus spissus Fr.—H 145, Vermilion lake. On birch. (Determined by *Ellis.*)

Polyporus subspadiceus Fr.—H 246, Vermilion lake.

Polyporus vaporarius Fr.—H 154, Vermilion lake. On rotten limbs. (Determined by *Ellis.*)

Polyporus varius Fr.—H 24, H 222, Vermilion lake. On fallen logs and limbs.

Polyporus velutinus Fr.—H 161, Vermilion lake. On fallen limbs.

Polyporus violaceus Fr.—H 234, Vermilion lake. On fir. (Determined by *Ellis.*)

Polyporus vulgaris Fr.—H 70, H 253, Vermilion lake. On dead Abies. (Determined by *Ellis.*)

Russula fragilis Fr.—A 183, Vermilion lake. (Determined by *Peck.*)

Schizophyllum commune Fr.—H 69, Vermilion lake. On old stumps.

Solenia poriæformis (Pers.) Wint. (*Peziza pruniata* Schw.)—H 254, Vermilion lake. On rotten log. (Determined by *Ellis.*)

Stereum radiatum Pk.—H 240, Vermilion lake. (Determined by *Ellis.*)

Stereum rugosum Fr.—H 197, Vermilion lake. On birch.

Stereum spadiceum Fr.—H 218, Vermilion lake. (Determined by *Ellis.*)

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Trametes cinnabarina (Jacq.) Wint. (*Polyporus cinnabarinus* Fr.) —H 117, Vermilion lake. A 189, Agate bay.

Trametes sepium Bk.—H 72, Vermilion lake.

Trogia crispa Fr.—H 140, Vermilion lake. On dead Betula papyracea.

Typhula muscicola Fr.—H 235, Vermilion lake. On moss. (Determined by *Ellis.*)

TREMELLINEÆ.

Exidia glandulosa Fr.—H 43, Vermilion lake. On Salix discolor.

Hirneola auricula-judæ Berk.—H 185, Vermilion lake. On dead limbs.

Tremella mesenterica Fr.—H 190, St. Louis river. On tamarack.

GASTEROMYCETES.

Geaster triplex Jungh.—A 142, Vermilion lake. (Determined by *Peck.*)

Lycoperdon pyriforme Schæff.—A 104, A 136, A 193, Vermilion lake. On the ground in woods. (Determined by *Trelease.*)

Lycoperdon wrightii B. & C. (?)—A 144, Vermilion lake. An immature specimen, growing on a rotten log. (Determined by *Trelease.*)

USTILAGINEÆ.

Entyloma compositarum Farl.—H 243, Vermilion lake. On Lactuca canadensis.

UREDINEÆ.

Coleosporium sonchi-arvensis (Pers.) Lev.—H 83, H 102, H 165, H 251, Vermilion lake. II. On Aster, the first on A. umbellatus, and the second on A. corymbosus.

Melampsora epilobii (Pers.) Wint.—H 49, H 89, Vermilion lake. II. On Epilobium palustre, var. lineare, and E. coloratum. H 35, Duluth. II. On E. coloratum.

Melampsora populina (Jacq.) Wint.—H 198, Vermilion lake. II. On Populus tremuloides.

Melampsora salicis-capreæ (Pers.) Wint.—H 101, Vermilion lake. II. On Salix discolor. H 166, St. Louis river. II. On Salix myrtilloides.

Phragmidium rubi-idæi (Pers.) Wint.—H 205, Vermilion lake. II. & III. On Rubus strigosus.

Phragmidium subcorticium (Schrank.) Wint.—H 247, Vermilion lake. III. On Rosa acicularis. H 187, Vermilion lake. II. & III. On Rosa sayi. H 3, St. Louis river. II. On Rosa———.

Puccinia asteris Duby.—H 37, Duluth. On Aster macrophyllus. H 273, Agate bay. On Aster———.

Puccinia calthæ Lk.—H 96, Vermilion lake. II. On Caltha palustris.

Puccinia caricis (Schum.) Reb.—H 162, St. Louis river. III. On Carex adusta. H 217, Vermilion lake. II. & III. On C. intumescens.

Puccinia circææ Pers.—H 214, Vermilion lake. On Circæa alpina.

Puccinia flosculosorum (A. & S.) Roehl.—H 270, Agate bay. On Hieracium canadense.

Puccinia galii (Pers.) Wint.—H 94, Vermilion lake. On Galium asprellum.

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Puccinia grossulariæ (Gm.) Wint.— H 213, Vermilion lake. On Ribes rubrum.

Puccinia haleniæ Arthur & Holway (*n. sp.*). III. Sori irregularly confluent in indefinite groups on the stems and upper surface of the leaves, black, polished, solid, minutely papillose, remaining covered by the epidermis or sometimes tardily naked; teleutospores linear or cuneate-linear, smooth, brown with darker apex, 42–52 by 8–9 mu., epispore thin, apex squarely or obliquely truncate, or irregularly blunt, little or not at all thickened, pedicel very short, colored.— H 100, Vermilion lake. On Halenia deflexa.

To the unaided eye this bears more resemblance to some pyrenomycetous fungi than to the rusts.

Puccinia maydis Carr.— H 136, Vermilion lake. II. On Zea mays.

Puccinia menthæ Pers.— H 236, Vermilion lake. II. On Mentha canadensis.

Puccinia mesomegala B. & C.— H 18, Vermilion lake. On Clintonia borealis.

Puccinia nardosmii E. & E.— H 232, Vermilion lake. On Petasites palmata.

Puccinia ornata Arthur & Holway (*n. sp.*) III. Sori hypophyllous, papilliform, prominent, circinately clustered on bright reddish-purple spots 5-10 mm. in diameter, often forming a wart-like cluster at the centre, chocolate-brown; teleutospores elongated oval or oblong, smooth, uniformly brown, somewhat constricted at the septum, 33-50 by 15-22 mu, epispore rather thin, apex obtuse or rounded, slightly or not at all thickened, base rounded or somewhat narrowed, pedicel thick, slightly colored, once to twice the length of the spore.— H 223, Vermilion lake. On Rumex britannica L. (*R. orbiculatus* Gray.)

This belongs to the section Leptopuccinia; the germinating spores give a whitened or moldy appearance to the central sori of each cluster.

Puccinia phragmitis (Schum.) Korn.— H 137, Vermilion lake. II. & III. On Phragmites communis.

Puccinia polygoni-amphibii Pers.— H. 48, H. 50, Vermilion lake. On Polygonum muhlenbergii.

Puccinia porphyrogenita Curt. — H 108, Vermilion lake. On Cornus canadensis.

Puccinia tanaceti DC.— H 133, Vermilion lake. II. On Helianthus giganteus.

Puccinia tiarellæ B. & C.— H 62. Vermilion lake. On Mitella nuda.

Puccinia tomipara Trel.— H 12, Vermilion lake. II. On Bromus ciliatus.

Puccinia violæ (Schum.) Wint.— H 131, Vermilion lake. II. & III. On Viola blanda.

Triphragmium clavellosum Berk.— H 17, Vermilion lake. On Aralia nudicaulis.

Uromyces orobi (Pers.) Wint.— H 25, Vermilion lake. II. On Vicia americana.

Uromyces polygoni (Pers.) Fckl.— H 5, H 113, H 116, Vermilion lake. II. & III. On Polygonum aviculare.

Uromyces trifolii (A. & S.) Wint.— H 34, Duluth. I. & II. On Trifolium repens.

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Isolated imperfect forms.

Æcidium compositarum Mart.—H 141, Vermilion lake. On Solidago.

Æcidium lycopi Ger.—H 216, Vermilion lake. On Lycopus virginicus.

Æcidium porosum Pk.—H 14, Vermilion lake. On Vicia americana.

Æcidium ranunculacearum DC.—H 212, Vermilion lake. On Ranunculus abortivus.

Æcidium thalictri Grev.—H 210, Vermilion lake. On Thalictrum purpurascens.

Cæoma agrimoniæ Schw.—H 209, Vermilion lake. On Agrimonia eupatoria.

Peridermium abietinum (A. & S.) Thum., var. **decolorans** Thum.—H 93, Vermilion lake. On Picea nigra.

Peridermium balsameum Pk.—H 208, Vermilion lake. On Abies balsamea.

Uredo pyrolæ (Gm.) Wint.—H 27, Vermilion lake. On Pyrola secunda.

LICHENES.

Determined by Mr. Henry Willey, except Nos. B 24*a*, B 39, B 40, and B 195, which were determined by Prof. F. Le Roy Sargent.

Alectoria jubata (L.) Tuck.—A 168, St. Louis river.

Buellia parasema (Ach.) Kbr.—A 87, Vermilion lake. On birch.

Cetraria lacunosa Ach.—A 181, Vermilion lake.

Cladonia cristatella Tuck.—A 123, Vermilion lake.

Cladonia gracilis (L.) Nyl., var. **elongata** Fr.—A 122, Vermilion lake.

Cladonia gracilis (L.) Nyl., var. **verticillata** Fr.—A 17, A 19, B 40, Vermilion lake.

Cladonia rangiferina (L.) Hoffm.—B 24*a*, A 121, Vermilion lake.

Collema cyrtaspis Tuck.—A 45, Vermilion lake. On standing tree trunks.

Collema nigrescens (Huds.) Ach.—A 27, A 97, Vermilion lake.

Endocarpon miniatum (L.) Schr., var. **aquaticum** Schr.—A 132, St. Louis river. On partially submerged rocks.

Evernia prunastri (L.) Ach.—A 115, Vermilion lake.

Graphis scripta (L.) Ach.—A 39, A 169, Vermilion lake.

Lecanora subfusca (L.) Ach., var. **distans** Ach.—A 79, Vermilion lake.

Lecidea enteroleuca Ach.—A 23, A 170, Vermilion lake.

Leptogium myochroum (Ehr., Schar.) Tuck., var. **saturnium** Schar.—A 37, Vermilion lake. On dead tree trunks.

Parmelia caperata (L.) Ach.—A 25, Vermilion lake.

Parmelia olivacea (L.) Ach.—A 80, Vermilion lake.

Parmelia physodes (L.) Ach.—A 28, Vermilion lake.

Parmelia tiliacea (Hoffm.) Flk.—A 26, Vermilion lake.

Peltigera aphthosa (L.) Hoffm.—B 39, Vermilion lake. (Determined by *Sargent.*)

Peltigera canina (L.) Hoffm.—A 6, Vermilion lake. On the ground.

Peltigera polydactyla (Neck.) Hoffm.—A 131, St. Louis river. On the ground.

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Physcia cæsia (Hoffm.) Nyl.—A 171, Vermilion lake. On rocks.

Physcia stellaris (L.)—A 24, Vermilion lake.

Placodium aurantiacum (Lightf.) Nag. & Hepp.—A 145, Vermilion lake. On poplar.

Placodium cerinum (Hedw.) Nag. & Hepp.—A 93, Vermilion lake. On poplar.

Placodium elegans (Lk.) DC.—A 171, Vermilion lake.

Pyrenula ——?—A 105, Vermilion lake. On poplar.

Sticta amplissima (Scop.) Mass.—A 38, Vermilion lake.

Sticta pulmonaria (L.) Ach.—A 34, Vermilion lake.

Theloschistes chrysophthalmus (L.) Norm.—A 85, Vermilion lake.

Theloschistes concolor (Dicks.) Tuck.—A 94, Vermilion lake. On living Populus tremuloides.

Usnea barbata (L.) Fr., var. **cavernosa** Tuck.—A 167 in part, St. Louis river.

Usnea barbata (L.) Fr., var. **dasypoga** Fr.—A 167 in part, St. Louis river.

Usnea barbata (L.) Fr., var. **florida** Fr.—A 53, Vermilion lake. Sterile.

Usnea barbata (L.) Fr., var. **plicata** Fr.—B 195, Vermilion lake. (Determined by *Sargent.*)

PYRENOMYCETES.

Anthostoma flavo-viride Ellis & Holway (*n. sp.*) Stroma effused, thin, extending for two or more inches in length and one-half inch or more in width, covered at first with a thin coat of greenish-yellow, short, matted hyphæ, producing small (1-1½ mu), subglobose, subhyaline conidia, but finally bare and black. Perithecia membranaceous, black, globose (⅓ mm.), sunk in the scarcely altered substance of the wood, contracted above into a narrow neck which penetrates the thin stroma with a black papilliform ostiolum. Asci (spore bearing part) 75 by 6-7 mu, or including the slender base 120 mu long. Sporidia uniseriate, narrow elliptical, continuous, nearly hyaline at first, becoming dark, 10-12 by 4-4½ mu. The stroma is limited in the substance of the wood by a dark circumscribing line.—H 266, Vermilion lake. On decaying wood of Populus tremuloides.

Chilonectria cucurbitula (Curr.) Sacc.—H 178, Vermilion lake. On Abies. H 182, St. Louis river. On tamarack.

Claviceps ——?—A 134, St. Louis river. On Deyeuxia canadensis.

Daldinia concentrica (Bolt.) C. & De N.—H 256, Vermilion lake. On dead Alnus.

Diatrype stigma Fr.—H 120, H 112, Vermilion lake. The first on Alnus, the second on birch.

Diatrype tocciæana De Not.—H 55, Vermilion lake. On Alnus. (Determined by *Ellis.*)

Diatrypella betulina Pk.—H 39, H 90, Vermilion lake. The first on Betula papyracea, the second on B. pumila.

Eutypella cerviculata (Fr.) Sacc.—H 75, H 76, Vermilion lake. The first on Alnus incana, the second on Betula papyracea.

Gnomoniella coryli (Batsch.) Sacc.—H 139, Vermilion lake. On Corylus rostrata.

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Hypocrea citrina (Pers.) Fr.—H 146, H 245, Vermilion lake. The first on Exidia, the second on Polyporus. (The latter determined by *Ellis.*)

Hypocrea richardsoni Berk. & Mont.—H 45, Vermilion lake. On poplar.

Hypomyces aurantius (Pers.) Fckl.—H 115, Vermilion lake. On Polyporus. (Determined by *Ellis.*)

Hypomyces lactifluorum (Schw.) Tul.—H 143, Vermilion lake. On Lactarius.

Hypomyces rosellus Tul.—H 230, Vermilion lake. On Polyporus loricatus. (Determined by *Ellis.*)

Hypoxylon commutatum Nitsch.—H 144, Vermilion lake. On Alnus. (Determined by *Ellis.*)

Hypoxylon commutatum Nitsch., var. **holwayanum** Sacc.—H 248, Vermilion lake. On Alnus.

Hypoxylon ferrugineum Fr.—H 193, St. Louis river. On old logs. (Determined by *Ellis.*)

Hypoxylon fuscum (Pers.) Fr.—H 119, H 151, Vermilion lake. On Alnus incana.

Hypoxylon morsei B. & C.—H 99 Vermilion lake. On Alnus.

Hypoxylon multiforme Fr.—H 262, Vermilion lake. On Betula papyracea.

Hypoxylon serpens (Pers.) Fr.—H 265, Vermilion lake. On poplar log. (Determined by *Ellis.*)

Hypoxylon transversum Schw.—H 41, Vermilion lake. On Betula papyracea.

Hysterium angustatum A. & S.—H 177, Vermilion lake. On Betula.

Hysterographium gerardii (C. &. P.) Sacc.—H 200, Vermilion lake. On old board. (Determined by *Ellis.*)

Hysterographium fraxini De Not.—H 224, Vermilion lake. On Fraxinus.

Lasiosphæria hirsuta (Fr.) C. & De N.—H 40, Vermilion lake. On rotten log.

Lasiosphæria ovina (Pers.) C. &. De N.—H 148, Vermilion lake. On rotten wood.

Lophodermium maculare (Fr.) De N.—H 74, Vermilion lake. On fallen leaves of Ledum. (Determined by *Ellis.*)

Lophodermium pinastri (Schrad.) Chev.—H 107, Vermilion lake. On leaves of Pinus resinosus.

Melanconis alni Tul.—H 268, Vermilion lake. On Alnus incana.

Melanconis stilbostoma (Fr.) Tul.—H 63, Vermilion lake. On Betula pumila.

Nectria episphæria Fr.—H 111, Vermilion lake. On Diatrype stigma.

Nectria perforata Ellis & Holway. (*n. sp.*) Perithecia gregarious and subconfluent, $\frac{1}{6}$–$\frac{1}{5}$ mm. in diameter, subtuberculose roughened and pruinose furfuraceous, pale at first, becoming orange-red, depressed-globose, ostiolum papilliform, collapsing when dry so that the perithecia appear broadly perforated above. Asci clavate-cylindrical, 75 by 7–8 mu, without paraphyses. Sporidia obliquely uniseriate, elliptical or subovate, smooth, uniseptate, hyaline or with a faint tinge of rose-color.—H 260, Vermilion lake. On a decaying Agaricus of the section Pleurotus.

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Plowrightia morbosa (Schw.) Sacc.—H 163, Vermilion lake. On Prunus pennsylvanicus.

Valsa nivea Fr.—H 103, Vermilion lake. On Populus tremuloides.

Valsa salicina Fr.—H 77, Vermilion lake. On Salix discolor. (Determined by *Ellis.*)

Isolated imperfect forms.

Bactridium ellisii Berk.—H 109, Vermilion lake. On rotten wood.

Cercospora leptosperma Pk.—H 152, Vermilion lake. On Aralia nudicaulis.

Didymaria ungeri Cda. (*Ramularia didyma* Ung.)—H 88, Vermilion lake. On Ranunculus pennsylvanicus.

Fusarium berenice (B. & C.) Sacc.—H 67, Vermilion lake. On Abies balsamea.

Glomerularia corni Pk.—H 2, Vermilion lake. On Cornus canadensis.

Melanconium betulinum Schm. & Kze.—H 97, Vermilion lake. On Betula papyracea. H 85, Vermilion lake. On Betula pumila.

Melanconium bicolor Nees.—H 95, Vermilion lake. On Betula papyracea.

Oidium radiosum Lib.—H 272, Agate bay. On Populus balsamifera.

Ramularia tulasnei Sacc.—H 206, Vermilion lake. On Fragaria virginiana.

Ramularia urticæ Ces.—H 164, Vermilion lake. On Urtica gracilis.

Ramularia variabilis Fckl.—H 9, Duluth. On Verbascum thapsus.

Ramularia variegata Ellis & Holway (*n. sp.*) Spots amphigenous, large, indefinite, ½-1 cm. in diameter, above reticulately spotted with white or brown, less distinctly so below. Hyphæ amphigenous, but mostly hypophyllous, fasciculate, hyaline, simple, toothed above, 15-25 by 4 mu. Conidia oblong-cylindrical, hyaline, uniseptate, and often constricted at the septum, 20-35 by 3½-4½ mu.—H 233, Vermilion lake. On living leaves of Petasites palmata.

Septoria astragali Desm.—H 60, Vermilion lake. On Lathyrus ochroleucus.

Septoria coptidis B. & C.—H 231, Vermilion lake. On Coptis trifoliata.

Septoria corylina Pk.—H 207, Vermilion lake. On Corylus rostrata.

Septoria mimuli E. & K.—H 105, Vermilion lake. On Mimulus ringens.

Septoria polygonorum Desm.—H 153, Vermilion lake. On Polygonum cilinode.

Septoria rubi West., var. **pallida** E. & H.—H 47, Vermilion lake. On Rubus hispidus.

Stilbum tomentosum Schr.—H 114, Vermilion lake. On some myxogaster.

Trichothecium roseum (Pers.) Lk.—H 181, St. Louis river. On tamarack.

Zygodesmus sublilacinus Ellis & Holway (*n. sp.*). Forms a continuous, thin, felt-like stratum of a dirty lilac color on rotton wood (of some deciduous tree) and on birch bark. Margin slightly paler. Main hyphæ coarse, much branched, the tips of the branches enlarged and bearing the coarsely echinulate, rather irregularly shaped spores, about 7 mu in diameter,

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on distinct spicular sporophores.—H 188, Vermilion lake. The same thing has been found at Newfield, N. J., on bark of pine log.

HELVELLACEÆ.

Cenangium cerasi Fr.—H 157, Vermilion lake. On Prunus pennsylvanica.

Chlorosplenium versiforme Fr.—H 267, Vermilion lake. On old stumps.

Ciboria tabacina Ellis & Holway (*n. sp.*). Stem slender, almost filiform, slightly enlarged above, ½-1½ cm. long, and like the outside of the perithecium, yellowish tobacco-brown. Perithecia cupulate-patelliform, 1½-2½ mm. in diameter, subrugulose beneath, margin entire and even, only slightly incurved. Disk slate-color, concave. Asci cylindrical, 100-115 by 9-11 mu. Paraphyses stout, yellowish, gradually but only slightly thickened above. Sporidia uniseriate, elliptical, mostly with a single large nucleus, yellowish-hyaline, 9-12 by 4-5 mu.—H 68, Vermilion lake. On decaying petioles.

C. Sydowiana Rehn. grows also on petioles, and has much the same microscopical characters except that the sporidia are broader (5-7 mu) and somewhat curved, but the stem is much shorter and thicker, the perithecium subcyathoid, and the whole plant pale. *C. calopus* Fckl. is of a different color, and has the asci and sporidia larger, and so of *C. firma* Pers., to both of which species the Minnesota plant bears some resemblance, though its peculiar color and neat appearance enable one to distinguish it even with the naked eye. The measurements of the stem, etc., and notes of color, are from the dry specimens.

Exoascus alnitorquus (Tul.) Sad.—H. 215, Vermilion lake. On Alnus incana.

Geoglossum luteum Pk.—H 195, St. Louis river. In swamps.

Habrostictis ocellata Fckl. (*Stictis lecanora* Fr.)—H 38, Vermilion lake. On Salix discolor. (Determined by *Ellis.*)

Heliotium citrinum Fr.—H 228, Vermilion lake. More distinctly stipitate than usual. (Determined by *Ellis.*)

Patellaria fenestrata C. & P.—H 118, Vermilion lake. On dead twigs of Populus tremuloides.

Peziza agassizii B. & C.—H 179, St. Louis river. On tamarack.

Peziza (Dasys) **borealis** Ellis & Holway (*n. sp.*). Briefly stipitate, about 1 mm. in diameter, globose when dry and nearly closed, densely shagged and fringed with gray hairs, the marginal ones 80-100 mu long, and 2½ mu thick. Disk pale. Asci cylindrical, sessile, 75-80 by 7-8 mu. Paraphyses stout (2½ mu thick), pointed above and slightly exceeding the asci. Sporidia clavate-fusoid, nucleolate, hyaline, straight or a little curved, 2-seriate, 20-22 by 3-4 mu.—H 264, Vermilion lake. On rotten wood, which is overspread with a brown Zygodesmus. We can not say whether the Zygodesmus is accidental or of the nature of a subiculum. When dry it much resembles *Cyphella ravenelii* B.

Peziza carbonaria A. & G.—H 191, St. Louis river. On the ground. (Determined by *Ellis.*)

Peziza cupressi Batsch.—H 225, Vermilion lake. On fallen leaves of Thuya.

Peziza dehnii Rabh.—H 176, Vermilion lake. On living Potentilla.

Peziza fusco-carpa Ellis & Hol.—H 189, St. Louis river. On logs.

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Peziza hemispherica Wigg.—H 159, Vermilion lake. On rotten wood.

Peziza macropus Pers. (*P. subclavipes* Phil. & Ellis.)—H 227, Vermilion lake. (Determined by *Ellis.*)

Peziza (Humaria) **olivatra** Ellis & Holway (*n. sp.*). Carnose, about 2 mm. across, attached by a central point, smooth and blackish outside, with the thin margin lighter. Disk concave, dark olive when dry. Asci clavate-cylindrical, 70-75 by 6-7 mu, subsessile. Paraphyses, yellowish-brown, about as long as the asci, scarcely thickened above. Sporidia biseriate, oblong, yellowish-hyaline, rounded at the ends, 6-7 by 1½-2 mu. The margin, when dry, is more or less undulate, but not strongly incurved.—H 269, Vermilion lake. On old stumps.

Peziza repanda Wahl.—H 258, Vermilion lake. On rotten wood.

Peziza scutellata L.—H 149, Vermilion lake. On old logs.

Rhytisma andromeda Fr.—H 186, Vermilion lake. On Andromeda polifolia.

Spathularia flavida Pers.—H 194, St. Louis river. In swamps.

PERISPORIACEÆ.

Erysiphe aggregata (Pk.)—H 51, Vermilion lake. On Alnus incana.

Erysiphe cichoraceorum DC.—H 78, Vermilion lake. On Echinospermum virginicum.

Microsphæra dubi Lev.—H 150, H 242, Vermilion lake. The latter on an undetermined species of Lonicera; the first on L. hirsuta.

Sphærotheca castagnei Lev.—H 46, Vermilion lake. On Rubus hispidus.

Sphærotheca pannosa Lev.—H. 84, Vermilion lake. On Ribes floridum.

OOPHYTA.

PERONOSPOREÆ.

Cystopus bliti (Bivon) Lev.—H 134, Vermilion lake. On Amarantus retroflexus.

Cystopus candidus (P.) Lev.—H 244, Vermilion lake. On Capsella bursa-pastoris.

Cystopus cubicus (Strauss) Lev.—H 241, Vermilion lake. On Cnicus.

Peronospora arthuri Farl.—H 271, Agate bay. On Œnothera biennis.

Peronospora effusa (Grev.) Rabh., var. **minor** Farl.—H 135, Vermilion lake. On Chenopodium album.

Peronospora gangliformis (Bk.) DeB.—H 81, Vermilion lake. On Mulgedium leucophæum.

Peronospora potentillæ De B.—H 86, Vermilion lake. On Geum macrophyllum.

VOLVOCINEÆ.

Volvox globator L.—A 52, Vermilion lake. In water among moss in a low grassy spot. (Determined by *Wolle.*)

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CONFERVACEÆ.

Chætophora endiviæfolia Ag., var. **ramosissima** Rab.—A 78, Vermilion lake. (Determined by *Wolle.*)

Chætophora pisiformis Ag.—A 191 in part, St. Louis river. In running water. (Determined by *Wolle.*)

Conferva tenerrima Kg.—A 57, Vermilion lake. (Determined by *Wolle.*)

ZYGOPHYTA.

MESOCARPEÆ.

Mesocarpus scalaris Has. (?)—A 173 in part, St. Louis river. Clear running water; sterile. (Determined by *Wolle.*)

DIATOMACEÆ.

Determined by Mr. B. W. Thomas, from a single gathering taken from the running water of a ditch in a sphagnous swamp.

Eunotia lunaris Grun.—A 172 in part, Vermilion lake.

Eunotia prærupta, var. **bidens** Grun.—A 172 in part, Vermilion lake.

Melosira varians Ag.—A 172 in part, Vermilion lake.

Navicula limosa K.—A 172 in part, Vermilion lake.

Navicula limosa K., var. **subinflata** Grun.—A 172 in part, Vermilion lake.

Navicula major K.—A 172 in part, Vermilion lake.

Navicula parva Ralfs.—A 172 in part, Vermilion lake.

Navicula viridis K.—A 172 in part, Vermilion lake.

Stauroneis anceps E.—A 172 in part, Vermilion lake.

Stauroneis phœnicenteron E.—A 172 in part, Vermilion lake.

Tabellaria fenestrata K.—A 172 in part, Vermilion lake.

Tabellaria flocculosa K.—A 172 in part, Vermilion lake.

DESMIDIEÆ.

Determined by Rev. Francis Wolle.

Closterium dianæ Ehrb.—A 190 in part, Vermilion lake. Ditch in sphagnous swamp.

Closterium parvulum Nag.—A 184 in part, A 190 in part, Vermilion lake. In sphagnous swamp.

Closterium striolatum Ehrb.—A 149 in part, St. Louis river. A 190 in part, Vermilion lake.

Closterium venus Kg.—A 184 in part, Vermilion lake. In cold sphagnous swamp.

Cosmarium botrytis Menegh.—A 184 in part, Vermilion lake.

Cosmarium cucumis Cda.—A 184 in part, Vermilion lake.

Cosmarium nasutum Nord.—A 189 in part, St. Louis river. In open sphagnous swamp.

Cosmarium nitidulum De Not.—A 187 in part, St. Louis river. In sphagnous swamp.

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Cosmarium ornatum Ralfs.—A 173 in part, St. Louis river.

Cosmarium speciosum Lund., var. **abbreviatum** Wolle (*n. var.*)—Differs from the type-form in being only about one-tenth longer than broad; not one-half longer, as described by Lundell, and as hitherto found.—A 149 in part, A 173 in part, St. Louis river. In clear water running through a ditch in a sphagnous swamp.

Cosmarium tetraophthalmum (Kg.) Breb.—A 184 in part, Vermilion lake. A 189 in part, St. Louis river.

Docidium trabecula (Ehrb.) Nag.—A 149 in part, St. Louis river. A 190 in part, Vermilion lake.

Euastrum ansatum (Ehrb.) Ralfs.—A 190 in part, Vermilion lake.

Euastrum crassum (Breb.) Kg.—A 196 in part, St. Louis river. In clear water running through sphagnous swamp.

Euastrum elegans Kg.—A 189 in part, St. Louis river.

Euastrum oblongum Ralfs.—A 149 in part, St Louis river. A 190 in part, Vermilion lake.

Euastrum verrucosum (Ehrb.) Ralfs.—A 173 in part, St. Louis river.

Penium closterioides Ralfs.—A 192 in part, St. Louis river. In clear water in a sphagnous swamp.

Penium oblongum De B.—A 187 in part, A 188, St. Louis river.

Staurastrum alternans Breb.—A 149 in part, St. Louis river.

Staurastrum brevispina Breb.—A 192 in part, St. Louis river.

Staurastrum dejectum Breb.—A 190 in part, St. Louis river.

Staurastrum dickiei Ralfs.—A 149 in part, St. Louis river.

Staurastrum furcigerum Breb.—A 190 in part, Vermilion lake.

Staurastrum hirsutum (Ehrb.) Breb.—A 173 in part, St. Louis river.

Staurastrum orbiculare (Ehrb.) Ralfs.—A 190 in part, Vermilion lake.

Staurastrum rugulosum Breb.—A 184 in part, Vermilion lake.

Staurastrum scabrum Breb.—A 191 in part, St. Louis river. Clear water in sphagnous swamp.

Staurastrum spongiosum Breb.—A 190 in part, Vermilion lake.

Staurastrum subarcuatum Wolle.—A 190 in part, Vermilion lake.

Staurastrum teliferum Ralfs.—A 184 in part, Vermilion lake. A 190 in part, St. Louis river.

PANDORINEÆ.

Pandorina morum Bory.—A 54, Vermilion lake. (Determined by *Wolle.*)

PROTOPHYTA.

PALMELLACEÆ.

Tetraspora lubrica Ag., var. **lacunosa,** Chauv.—A 192 in part, St. Louis river. In clear flowing water. (Determined by *Wolle.*)

CHROOCOCCACEÆ.

Merismopedia elegans A. Br. (?)—A 190 in part, Vermilion lake. (Determined by *Wolle.*)

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OSCILLARIACEÆ.

Leptothrix ochracea Kg. (*Lyngbya ochracea* Thur.)—A 58, Vermilion lake. (Determined by *Wolle.*)

Oscillaria gracillima Kg.—A 56, Vermilion lake. (Determined by *Wolle.*)

Oscillaria tenerrima Kg.—A 76, A 109, Vermilion lake. (Determined by *Wolle.*)

RIVULARIACEÆ.

Glœotrichia natans Thur.—A 186, Vermilion lake. Floating in the water of the lake; from the size of a pea to two inches in diameter. (Determined by *Wolle.*)

Glœotrichia pisum Thur. (*Rivularia fluitans* Cohn.)—A 77, Vermilion lake. Floating in the lake in small quantity; not found attached. This is the same plant that has attracted so much attention at Waterville, Minn., and vicinity, on account of its supposed poisonous effects upon cattle—a supposition that has not been substantiated.

NOSTOCACEÆ.

Nostoc lichenoides Vauch.—A 148, St. Louis river. On the ground among moss. (Determined by *Wolle.*)

MYXOMYCETES.

Arcyria cinerea (Bull.) Rostf.—H 124, Vermilion lake. (Determined by *Rex.*)

Arcyria nutans Bull.—H 64, Vermilion lake.

Arcyria œrstedii Rostf.—H 92, Vermilion lake. (Determined by *Rex.*)

Arcyria punicea Pers.—H 7, Duluth.

Chondrioderma michelii (Lib.) Rostf., var. **sessilis** Rostf.—H 167, Vermilion lake. (Determined by *Rex.*)

Clathroptychium rugulosum (Wall.) Rostf.—H 261, Vermilion lake.

Comatricha pulchella Bab. (?)—H 126, Vermilion lake. (Determined by *Rex.*)

Cribraria argillacea Pers.—H 170, Vermilion lake. (Determined by *Rex.*

Diachæa leucopoda (Bull.) Rostf.—H 6, Duluth.

Dictydium cernuum (Pers.)—H 129, Vermilion lake.

Hemiarcyria clavata (Pers.) Rostf.—H 174, Vermilion lake.

Hemiarcyria rubiformis (Pers.) Rostf.—H 199, Vermilion lake.

Lamproderma arcyrioides (Somf.) Rostf. (?)—H 123, Vermilion lake. (Determined by *Rex.*)

Lycogala epidendrum Brex.—H 56, Vermilion lake. On decayed wood.

Stemonites dictyospora Rostf.—H 33, Vermilion lake.

Stemonites ferruginea Ehr.—H 168, H. 169, Vermilion lake. The latter has spores unusually small. (Determined by *Rex.*)

Tilmadoche nutans Pers. (?)—H 127, Vermilion lake. (Determined by *Rex.*)

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Trichia chrysosperma Bull.—H 121, H 202, Vermilion lake. The latter varies considerably from the typical form.

Tubulina cylindrica Bull.—H 171, St. Louis river.

CHYTRIDINEÆ.

Synchytrium asari Arthur & Holway (*n. sp.*). Spots indistinct; galls flattened hemispherical, scattered; resting spores solitary, spherical, .10-.12 mm. in diameter; epispore dark brown, smooth.—A 86, Vermilon lake. On leaves and petioles of Asarum canadense.

The galls are formed by the swollen epidermal cells surrounding the host-cell, and are depressed in the centre, apparently forming a pore. They are thickly scattered over the petiole and both surfaces of the leaf, either over the whole leaf, which is the usual way; or over definite portions of it. The color of the leaf is scarcely altered, but the affected leaves are made conspicuous by the minutely blistered and somewhat distorted appearance given by the parasite. The spores are very uniform in size and shape.

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PLANTS COLLECTED OR OBSERVED ON THE BLUFF AT DULUTH, JULY 17, 1886.

By L. H. Bailey, Jr.

The following plants were observed upon the high receding bluff just back of Duluth. The original timber has long been removed, the present ligneous plants consisting of scattered clumps of bushes.

Juncus bufonius *L.*
Juncus tenuis *Willd.*
Anaphalis margaritacea *Benth. & Hook.*
Cerastium viscosum *L.*
Taraxacum officinale *W.*
Cornus canadensis *L.*
Quercus rubra *L.*
Thuya occidentalis *L.*
Acer saccharinum *Wang.*
Acer spicatum *Lam.*
Corylus rostrata *Ait.*
Abies, species undeterminable. A few small plants.
Fragaria vesca *L.* Common.
Fragaria virginiana *Ehrh.* Not common.
Potentilla norvegica *L.*
Achillea millefolium *L.*
Trifolium repens *L.*
Trifolium pratense *L.*
Polygonum aviculare *L.*
Plantago major *L.*
Pteris aquilina *L.*
Rumex acetosella *L.*
Aquilegia canadensis *L.*
Rubus strigosus *Michx.*
Rubus nutkanus *Moc.* Common.
Salix discolor *Muhl.*
Epilobium coloratum *Muhl.*
Epilobium spicatum *Lam.*
Capsella bursa-pastoris *Mœnch.*
Verbascum thapsus *L.*
Chenopodium album *L.*
Prunus pennsylvanica *L.* Much attacked by the fungus *Plowrightii morbosa* Sacc.
Diervilla trifida *Mœnch.*

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Ranunculus abortivus *L.*
Geranium robertianum *L.*
Cnicus lanceolatus *Hoffm.*
Amarantus albus *L.*
Galium aparine *L.*
Cornus alternifolia *L.*
Heracleum lanatum *Michx.*
Sambucus canadensis *L.*
Betula papyrifera *Marshall.*
Tilia americana *L.*
Carex deweyana *Schw.*
Carex arctata *Boott.*
Carex pennsylvanica *Lam.*
Carex tenella *Schk.* In sunny, dry places.
Agrostis scabra *Willd.*
Phleum pratense *L.*
Polygonum cilinode *Michx.*
Juncus bufonius *L.*
Galeopsis tetrahit *L.*
Lathyrus paluster *L.*
Poa compressa *L.*
Stellaria borealis *Bigelow.*
Polygonum aviculare *L.* A singular, erect, short-jointed form.

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SUPPLEMENT TO THE FLORA OF MINNESOTA.

By Warren Upham.

The following notes, chiefly received from the botanists named on pages 10 and 181 of my *Flora of Minnesota*, show the accessions to the known flora of this state, and to knowledge of the geographic range of species, since the publication of that report two years ago, without, however, including the plants collected at Vermilion lake and vicinity by the botanical party of the State Survey, during the season of 1886. Twenty-two localities are added on the authority of Mr. L. R. Moyer and sister, of Montevideo, who have furnished a catalogue of species growing in Chippewa county.

Descriptions of the plants added are found either in Gray's *Manual* or in Coulter's *Manual of Rocky Mountain Botany*, excepting three, of which descriptions are here given.

Accessions.

Anemone nudicaulis, Gray. "I wish to direct the attention of any of our own botanists, who may next summer be visiting lake Superior, to a singular Anemone which grows in bogs and on banks near the water at Sand bay, Minnesota, very near lat. 48°, and in or near the Canadian boundary. All I know of it is from a specimen sent to me in a letter, dated August 8, 1870, from Mr. Joseph C. Jones, then of the U. S. Steamer *Search*. He wrote that the plant was found growing in mossy ground, close to the water's edge, and also in bogs, and that it grows in the manner of Coptis trifolia. I believe it has filiform rootstocks, like those of Anemone Richardsoni, and the radical leaves are so like those of that species thst I inadvertently mistook the plant for that species. But the involucre consists of a single petiolate leaf, very like the radical, or else is wholly wanting. And the akenes are tipped with rather short and hooked styles, very unlike the long ones of the aforesaid Arctic species. A flowering specimen is a desideratum."—*Asa Gray* in *Botanical Gazette*, xi, 17, Jan., 1886.

Arabis patens, Sullivant. Rock Cress.

Nicollet county, in a deep ravine beside a water-fall near the Minnesota river, five miles above Mankato, *Leiberg*.

Crotalaria sagittalis, L. Rattle-box.

Shore of a little pond close to Mahtomedi station, *Miss Butler*.

Trifolium agrarium, L. *Yellow Clover. Hop Clover.*

Ramsey county, *Oestlund*.

Trifolium procumbens, L., var. *minus*, Koch. *Smaller Yellow* or *Hop Clover.*

Stearns county, *Campbell;* becoming abundant in some parts of southern Minnesota, specially observed near Winnebago City (displacing Mayweed and other weeds, "even more rapidly than white clover"), *Gedge;* Pipestone City, *Mrs. Bennett*.

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Rosa blanda, Ait. (Including var. pubescens, Crepin.) Wild Rose.

Duluth, *Engelmann.* Probably frequent in eastern and northern Minnesota, "on rocks and rocky shores of rivers and lakes." It ranges from Newfoundland, Hudson bay and lake Winnipeg, south to Vermont, northern New York, Illinois and Wisconsin. *Watson* in *Proc. Am. Acad. of Arts and Sciences*, xx, 339, Jan., 1885. Winona county, *Holzinger.*

Rosa Sayi, Schweinitz. Wild Rose.

Surely in northern Minnesota. Frequent in the Rocky mountains from Colorado to British America, and on the south and north shores of lake Superior and northward. *Watson*, l. c., 340.

Rosa Arkansana, Porter. (R. blanda, Ait., var. setigera, Crepin.) Wild Rose.

Very frequent in the mountains from western Texas and New Mexico to British America, and eastward to the upper Mississippi and Saskatchewan. . . . The most pubescent form of this species is common upon dry prairies from the upper Mississippi westward and to the Saskatchewan. The flowers are here sometimes white. In eastern Minnesota and Iowa it occurs with the receptacle more or less hispid. *Watson*, l. c., 341. Winona county, *Holzinger.*

Rosa Woodsii, Lindl. Wild Rose.

Missouri to Colorado and northward to western Montana, the Saskatchewan and Slave lake, chiefly on the plains and in the valleys.—Minnesota, *Sykes*, near Minneapolis, *Miss Butler;* Dakota, *Nicollet*, at Mandan, *Meehan;* Montana, on Tongue river, *Roberts*, etc. *Watson*, l. c., 345.

[The four preceding species take the place of the two varieties of R. blanda.]

Œnothera biennis, L., var. **cruciata,** Torr. & Gray. Evening Primrose.

Willow brook, between Glyndon and Muskoda, Clay county, *Gedge.*

Erigenia bulbosa, Nutt. Harbinger-of-Spring. Pepper-and-salt.

Lake City, *Miss Manning.* Southeast.

Petasites palmata, Gray. (Nardosmia palmata, Hook.) Sweet Coltsfoot.

Tower, Vermilion lake, and Agate bay on lake Superior, *Sandberg;* near Duluth (abundant), *W. H. Stultz;* Leech lake and White Earth, *Dr. C. P. Allen;* Detroit, *W. W. Cooke.* North.

Aster acuminatus, Michx. Aster.

White Earth, *Dr. C. P. Allen.* North.

[Cacalia suaveolens, L., is found at Hesper, Iowa, close to the south line of Fillmore county, Minnesota, by *Mrs. Carter.*]

Senecio aureus, L., var. **borealis,** Torr. & Gray. Golden Ragwort.

Northwest angle of the Lake of the Woods, at the extreme northern point of Minnesota, *Macoun.* North.

Crepis runcinata, Torr. & Gray. Crepis.

Red river prairie and westward, *Dawson, Macoun.* West.

Lactuca Ludoviciana, DC. Wild Lettuce.

Winona county, *Holzinger.*

Campanula rotundifolia, L., var. **arctica,** Lange. (var. linifolia, Gray.) Harebell. Bluebell.

North shore of lake Superior, *Roberts;* Clay county, *Gedge;* "quite common in the whole prairie region extending from Manitoba to the Rocky mountains," *Macoun.*

Plantago major, L., var. **Asiatica,** Decaisne. Plantain.

Plentiful in the Red river valley, *Upham, Leiberg.* Northwest. Capsule

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usually more broadly ovoid; circumscissile near the base and much within the calyx. A very large indigenous form, perhaps a distinct species.—*Gray's Synoptical Flora of N. A.*

Pentstemon cristatus, Nutt. Beard-tongue.

Rising ground, Red river prairie and westward, *Dawson. Macoun's Catalogue of Canadian Plants.* West.

Pentstemon gracilis, Nutt. Beard-tongue.

On the 49th parallel near Emerson, Manitoba, and westward, *Burgess, Richardson*, etc. *Macoun's Catalogue.* West. Winona, *Holzinger.*

Monarda fistulosa, L., var. **mollis,** Benth. Wild Bergamot.

Red river valley, *Macoun.* West.

Gentiana Amarella, L., var. **stricta,** Watson. Gentian.

Frequent, or common, in northeastern Dakota, extending south to the Northern Pacific railroad, *Upham;* surely also extending into Minnesota. Northwest. "Frequent on open, grassy prairies from Winnipeg westward to the Rocky mountains. Easily distinguished by its strict habit and usually copious and light-colored flowers." *Macoun's Catalogue.*

Atriplex patula, L., var. **hastata,** Gray. Atriplex.

Common, or frequent on alkaline land in the Red river valley, *Upham;* determined by *Mr. Watson.*

Atriplex argentea, Nutt. Atriplex.

With the preceding, *Upham;* also determined by *Mr. Watson.* West.

Suæda depressa, Watson, var. **erecta,** Watson. Sea Blite.

Common, or frequent, on alkaline land in the Red river valley, *Upham.* Northwest.

Rumex obtusifolius, L. Bitter Dock.

Winona county, *Holzinger.*

Euphorbia platyphylla, L. *Spurge.*

Lake City (rare.), *Miss Manning.*

Salix cordata, Muhl., var. **vestita,** Anders. Diamond Willow.

Frequent, especially in the Red river valley. *Mr. Bebb* writes: "Prof. L. F. Ward and myself are utterly unable to account for the arrest of wood growth at the base of the atrophied twigs." This is not regarded by Mr. Bebb as worthy of a distinct varietal name. It is, however, very well known in many localities because of its diamond-shaped gnarls, which give its name, and make it a curiosity when used for canes or ornamental work.

Typha angustifolia, L. Narrow-leaved Cat-tail.

Rare on north shore of north half of Red lake (leaves $\frac{1}{4}$ to $\frac{1}{3}$ inch wide; staminate and pistillate parts of spike separated by $\frac{3}{4}$ inch of naked stem), *Upham.*

Sisyrinchium anceps, Cav. Blue-eyed Grass.

Sisyrinchium mucronatum, Michx. Blue-eyed Grass.

Prof. Coulter writes: "Our Sisyrinchiums are unquestionably two species. Very likely Miller's name should be substituted for one of them, but it is impossible without a half day's work in the library to tell which. They are both undoubtedly distinct from the Jamaica plant."

Carex* gynocrates, Wormskiold. Sedge.

Becker county, *Simmons;* determined by *Prof. Arthur.* North.

* Prof. L. H. Bailey, Jr., authorizes a correction in his *Synopsis of North American Carices*, in which Minnesota is credited with *Carex rariflora*, Smith (p. 94), and *C. pratensis*, Drej. (p. 147). Further examination of the specimens from the Minnesota localities cited shows that an error was made in the original determinations, and the citations should therefore be erased.

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Carex pauciflora, Lightfoot. Sedge.

Tower, Vermilion lake, and Agate bay, *Sandberg.* North.

Carex rosea, Schk., var. **radiata,** Dewey. Sedge.

Saint Cloud, *Campbell;* determined by *Mr. William Boott.* "More common than the species," *Bailey.*

Carex stenophylla, Wahl. Sedge.

Red river valley, *Leiberg;* determined by *Mr. Boott.* Emmet county, Iowa (rare), *Cratty;* determined by *Prof. Bailey.* West.

Carex adusta, Boott, var. **glomerata,** Bailey. Sedge.

Northern Minnesota, *Bailey.* Spikes few-flowered, aggregated into a loose, mostly tawny head; perigynium large, almost wingless, nearly filled by the large dark achenium.— *Bailey's Preliminary Synopsis of North American Carices.*

Carex straminea, Schk., var. **mirabilis,** Tuckerman. (C. cristata, Schk., var. mirabilis, Gray's *Manual.*)

Chisago county, *Sandberg.*

Carex flava, L. Sedge.

Saint Cloud, *Campbell;* determined by *Mr. Boott.*

Carex trichocarpa, Muhl. Sedge.

Chisago county, *Sandberg.*

Carex vesicaria, L. Sedge.

Red river valley, *Leiberg;* determined by *Mr. Boott.* Northwest.

Carex Tuckermani, Boott. Tuckerman's sedge.

Chisago county, *Sandberg.*

Carex rupestris, All. Sedge.

Red river valley, *Leiberg;* determined by *Mr. Boott.* North.

Stipa viridula, Trin. Feather-grass.

Frequent on alluvial soil in northeastern Dakota, from Grand Forks county northward, *Upham;* doubtless also reaching into Minnesota. West.

Milium effusum, L. Millet-grass.

Hennepin county, *Oestlund.*

Erasures.

The following should be erased:

Thalictrum Cornuti, L. The range of this species (T. polygamum, Muhl.) is stated by Prof. Trelease (*Botanical Gazette*, xi, 92) as "west to Ohio, but mostly confined to the Atlantic states;" it is probably not found in Minnesota. The specimens heretofore referred here belong to T. purpurascens, L.

Cardamine rotundifolia, Michx., in appendix. The C. rhomboidea, DC., var. purpurea, Torr., placed under this name, belongs with the typical C. rhomboidea.

Fragaria Virginiana, Duchesne. Our form of this is the var. Illinoensis, Gray. "The species seems to be confined to the Atlantic states," Coulter's *Manual.*

Cratægus tomentosa, L., var. pyrifolia, Gray. This variety is included with the typical species by Sargent's *Forest Trees of N. A.*

Gaillardia pinnatifida, Torr. The specimens referred here were undoubtedly G. aristata, Pursh.

Trillium erectum, L., var. album, P. Transfer the locality "Winona, *Holzinger*" from this species to T. grandiflorum, *Salisb.*

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Carex straminea, Schk., var. Crawei, Boott. This variety is included with the typical species by Bailey's *Synopsis of N. A. Carices.*

ADDITIONAL LOCALITIES.

Ranunculus affinis, R. Br., Two Harbors, lake Superior, *A. W. Jones.*

Ranunculus repens, L., var. hispidus, Torr. & Gray. Frequent in Blue Earth county, *Leiberg.*

Corydalis glauca, Pursh. Brown county, *Juni.*

Arabis lævigata, Poir. White Earth, *Dr. C. P. Allen.*

Sisymbrium Thaliana, Gay. Brown county, *Juni.*

Draba Caroliniana, Walt., var. micrantha, Gray. Common in Blue Earth county, *Leiberg.*

Vesicaria Ludoviciana, DC. Montevideo, Chippewa county, *Moyer.*

Viola lanceolata, L. Near the international boundary northeast of Vermilion lake, *A. W. Jones.* The northern limit of this species, as stated by *Dr. Gray*, is "from Nova Scotia to lake Superior," *Bot. Gaz.*, xi, 255.

Viola palmata, L.

Gray's revision of the violets (*Botanical Gazette*, xi, p. 254) makes it necessary to transfer the localities under V. cucullata, var. palmata of the catalogue to this species, to which should be added Winona county, *Holzinger.*

Viola palmata, L., var. cucullata, Gray. This name should be used instead of V. cucullata, *Gray, l. c.*

Viola sagittata, Ait. Leech lake, *Allen.*

Viola Canadensis, L. Abundant near Cannon lake, Rice county, *Miss Beane.* Quite plentiful in timbered bottoms, some varieties nearly white, Chippewa county, *Moyer.*

Viola pubescens, Ait., var. eriocarpa, Nutt. The prevailing form of this species in copses throughout the prairie part of the state, *Leiberg.*

Hudsonia tomentosa, Nutt. Sandy lake, close northeast of Minneapolis, *Simmons.*

Lechea minor, Walt. Common at Red lake, *Upham.*

Hypericum ellipticum, Hook. Dellwood, Ramsey county, *Kelley.*

Hypericum corymbosum, Muhl. Red Wing, *Sandberg.*

Arenaria Michauxii, Hook. White Earth, *Allen.*

Stellaria crassifolia, Ehrh. Lake City, *Miss Manning.*

Cerastium oblongifolium, Torr. Montevideo, Chippewa county, *Moyer.*

Malva sylvestris, L. Montevideo, Chippewa county, *Moyer.*

Linum perenne, L. Mahtomedi, Ramsey county, *Miss Butler.*

Ptelea trifoliata, L. Faribault, *Miss Beane.*

Rhus typhina, L. Red lake, near the Agency, *Upham.*

Rhus glabra, L. Plentiful near Tower, Vermilion lake, *A. W. Jones.*

Acer rubrum, L. Montevideo, Chippewa county, *Moyer.*

Trifolium arvense, L. Minneapolis, *Simmons.*

Trifolium hybridum, L. Near Duluth, *David F. Day.*

Melilotus alba, Lam. "Spreading along the roadsides in some parts of Cottonwood county to the exclusion of every other plant," *Juni.*

Dalea alopecuroides, Willd. Worthington, becoming plentiful as a weed beside roads in 1885, but rare in 1886, *Foote.*

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Petalostemon villosus, Nutt. Winona county, *Mrs. Dice.*

Astragalus flexuosus, Doug. Montevideo, Chippewa county, *Moyer.*

Hedysarum boreale, Nutt. White Earth, *Allen.*

Lathyrus maritimus, Bigelow. North half of Red Lake, *Upham.*

Lathyrus paluster, L., var. myrtifolius, Gray. Chippewa county, *Moyer.*

Phaseolus perennis, Walt. Lake City, *Miss Manning.*

Cratægus Crus-galli, L. Montevideo, Chippewa county, *Moyer.*

Ribes gracile, Mx. Chippewa county, *Moyer.*

Gaura coccinea, Nutt. Brown county, *Juni.* Chippewa county, *Moyer.*

Œnothera fruticosa, L. Lake City, *Miss Manning.*

Œnothera albicaulis, Nutt. Quite abundant, probably introduced, between Glyndon and Muskoda, *Gedge;* a frequent weed along railroads and in wheat-fields in northeastern Dakota, *Upham.*

Ludwigia palustris, Ell. Lake City, *Miss Manning.*

Opuntia fragilis, Haw. Lake of the Woods, in numerous localities, as reported by *Prof. Macoun* in letter, Dec. 2, 1884. (See note under O. Rafinesquii.)

Sicyos angulatus, L. Red lake, *Upham.*

Polytænia Nuttallii, DC. Dellwood, Ramsey county, *Kelley.*

Archemora rigida, DC. Winona county, *Holzinger.*

Pimpinella integerrima, Benth. & Hook. Leech lake, *Allen.*

Cryptotænia Canadensis, DC. White Earth, *Allen;* frequent in northeastern Dakota, *Upham.*

Aralia racemosa, L. Abundant at Leech lake and White Earth, *Allen.*

Cornus florida, L., in appendix. *Mr. J. S. Harris* reports that at least one tree of this species formerly grew in Houston county.

Lonicera Sullivantii, Gray. Leech lake and White Earth, *Allen;* Manitoba, *Macoun.*

Adoxa Moschatellina, L. Duluth, *W. H. Stultz;* determined by *Prof. T. C. Porter.*

Galium Aparine, L. White Earth, *Allen.*

Galium trifidum, L., var. pusillum, Gray. Vermilion lake, *A. W. Jones.*

Houstonia purpurea, L., var. longifolia, Gray. Chippewa county, *Moyer.*

Houstonia purpurea, L., var. ciliolata, Gray. Moose lake, Northern Pacific Junction, and Agate bay, *Sandberg.*

Liatris spicata, Willd. Chippewa county, *Moyer.*

Liatris punctata, Hook. Lake Calhoun, Minneapolis, *Miss Butler;* Lake City (rare), *Miss Manning.* Chippewa county, *Moyer.*

Kuhnia eupatorioides, L. Leech lake, *Allen.* Chippewa county, *Moyer.*

Kuhnia eupatorioides, L., var. corymbulosa, Torr. & Gray. Common in the prairie region of the state, *Leiberg.*

Eupatorium perfoliatum, L. Common at Red lake, *Upham.*

Petasites sagittata, Gray. White Earth, *Allen;* abundant near Hollson, Pembina county, Dakota, *Upham.*

Aster patens, Ait. Lake City (rare), *Miss Manning.*

Aster cordifolius, L. Rare or absent in the north part of the Red river valley, but frequent at Red lake, *Upham,* that being near its northwestern limit; Leech lake and White Earth, *Allen.*

Aster puniceus, L. White Earth, *Allen;* common at Saint Hilaire and frequent at Red lake and in northeastern Dakota, *Upham;* doubtless also frequent

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in the Red river valley. Its range extends west to the Rocky mountains in British America, *Macoun.*

Aster oblongifolius, Nutt. White Earth, *Allen;* Northeastern Dakota, *Upham.* Infrequent. South and west. Chippewa county, *Moyer.*

Aster linariifolius, L. Lake City, *Miss Manning.*

Solidago Missouriensis, Nutt. Montevideo, Chippewa county. *Moyer.*

Aplopappus spinulosus, DC. Abundant on dry, gravelly soil, as the beaches of lake Agassiz, in northeastern Dakota, *Upham.* West.

Polymnia Canadensis, L. Winona county, *Holzinger.*

Lepachys columnaris, Torr & Gray. Chippewa county, *Moyer.*

Coreopsis tinctoria, Nutt. Dellwood; Ramsey county, *Kelley.*

Coreopsis trichosperna, Michx. Lake City, *Miss Manning.*

Bidens Beckii, Torr. Vermilion lake, *A. W. Jones;* Lake City (rare), *Miss Manning.*

Artemisia frigida, Willd. Winona county, *Holzinger.*

Cacalia atriplicifolia, L. Lake City, *Miss Manning.*

Senecio aureus, L., var. obovatus, Torr & Gray. Vermilion lake, *A. W. Jones.*

Senecio canus, Hook. "Very abundant on many parts of the prairie region from the eastern part of Manitoba to the Rocky mountains," *Macoun.*

Cnicus undulatus, Gray. Chippewa county, *Moyer.*

Prenanthes crepidinea, Michx. Lake City, *Miss Manning.*

Lobelia Dortmanna, L. Burntside lake, Saint Louis county, *A. W. Jones.*

Campanula aparinoides, Pursh. The large-flowered form occurs at Vermilion lake, *A. W. Jones.*

Gaylussacia resinosa, T. & G. Winona county, *Holzinger.*

Epigæa repens, L. Near Red lake (rare), *Upham;* also, at an isolated locality in Plainview, Wabasha county, *Miss Manning.*

Kalmia glauca, Ait. Agate bay, lake Superior, and Vermilion lake, *Sandberg.*

Pyrola rotundifolia, L., var. incarnata, DC. Leech lake, *Allen;* common in swamps, Vermilion lake, *A. W. Jones.*

Pyrola rotundifolia, L., var. uliginosa, Gray. Common at Vermilion lake, *A. W. Jones.*

Monotropa uniflora, L. Rare northwestward; only one specimen found at White Earth, none about Red and Leech lakes, *Allen.*

Anagallis arvensis, L. Lake City (rare), *Miss Manning.*

Pentstemon grandiflorus, Nutt. Goodhue county, *Mrs. Richardson.*

Pentstemon acuminatus, Dougl. Chippewa county, *Moyer.*

Gerardia Skinneriana, Wood. Dellwood, Ramsey county, *Kelley.*

Phryma Leptostachya, L. White Earth, *Allen.*

Monarda punctata, L. Winona county, *W. C. Scott.*

Scutellaria versicolor, Nutt. Minnesota side of lake Pepin, 1885, *Miss Manning.*

Leonurus cardiaca, L. Leech lake, *Allen.*

Onosmodium Carolinianum, DC., var. molle, Gray. Frequent in northeastern Dakota, *Upham*, and in Manitoba, *Macoun.*

Mertensia paniculata, Don. Vermilion lake, *A. W. Jones.*

Myosotis verna, Nutt. Redstone, near New Ulm, *Juni.*

Gilia linearis, Gray. (Collomia linearis, Nutt.) Fort Francis on rainy river, and westward, *Macoun;* Red river prairie, *Dawson;* also, much east from its principal range, at Cannon Falls and Red Wing, *Sandberg.*

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Calystegia sepium, L., var. repens, Gray. Lake of the Woods and westward, *Dawson.*

Physalis Virginiana, Mill., var ambigua, Gray. Plentiful on sandy land between Mankato and Minneopa falls, *Leiberg.*

Nicandra physaloides, Gærtn. Red Wing, *A. W. Jones;* Chippewa county, *Moyer.*

Asclepias speciosa, Torr. East side of Loon lake, Blue Earth county, *Gedge;* Chippewa county, *Moyer.*

Chenopodium rubrum, L. Frequent on alkaline land in the Red river valley, *Upham;* determined by *Mr. Watson.* Our plant is the typical species, not the var. humile.

Salicornia herbacea, L. Infrequent, but in some places plentiful, on salty and alkaline moist land in the northern part of the Red river valley, *Upham.*

Amarantus blitoides, Watson. Lake City, *Miss Manning.*

Rumex salicifolius, Weinman. Vermilion lake, *A. W. Jones;* Chippewa county, *Moyer.*

Rumex verticillatus, L. Lake City, *Miss Manning.*

Ceratophyllum demersum, L. Red river valley, *Leiberg.*

Euphorbia glyptosperma, Engelm. Winona county, *Holzinger.*

Bœhmeria, cylindrica Willd. Dellwood, Ramsey county, *Kelley.*

Betula nigra, L. The first three localities given for this should be transferred to B. lutea.

Pinus Banksiana, Lamb. Rev. F. W. Smith of Red Lake Agency states that "watab" (see under Larix Americana) is mainly roots of this species of pine; but he says that roots of both tamarack and arbor vitæ are also used in the same way, all being alike called "watab." Watab river and township no doubt refer to the "jack pines" there.

Juniperus communis, L. Red lake (rare), *Upham.*

Zannichellia palustris, L. Doubtless common throughout the state, but overlooked, *Leiberg.*

Potamogeton Claytonii, Tuckerman. Vermilion lake, *A. W. Jones.*

Potamogeton lonchites, Tuckerman. Winona county, *Holzinger.*

Triglochin maritimum, L., var. elatum, Gray. Frequent at Saint Hilaire and northwestward, *Upham.*

Habenaria tridentata, Hook. White Bear lake, *Bailey.*

Spiranthes Romanzoffiana, Chamisso. Lake City, *Miss Manning.*

Arethusa bulbosa, L. Aitkin, *Miss Beane;* Lake City, *Mise Manning.*

Cypripedium arietinum, R. Br. Lake City, *Miss Manning.*

Uvularia grandiflora, Smith. Common at mouth of Pike river, Vermilion lake, *A. W. Jones.*

Uvularia perfoliata, L. White Earth, *Allen.*

Juncus bufonius, L. Sandy lake, close northeast of Minneapolis, *Simmons.*

Eriocaulon septangulare, With. White Bear lake, Ramsey county, *Kelley;* in a little pond close to Mahtomedi station (plentiful), *Miss Butler.*

Eleocharis pauciflora, Watson. Red river valley, *Leiberg;* determined by *Mr. Boott.*

Scirpus Torreyi, Olney. White Bear lake, *Bailey.*

Scirpus debilis, Pursh. Saint Cloud, *Campbell;* determined by *Mr. Boott.*

Carex crus-corvi, Shuttleworth. Chisago county, also Red Wing, *Sandberg.*

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Carex oligosperma, Michx. Chisago county, *Sandberg;* White Bear lake, *Bailey.*

Cinna pendula, Trin. Swamps in wet woods along the Minnesota river, in Blue Earth county, *Leiberg.*

Brachyelytrum aristatum, Beauv. Minneapolis, *Simmons.*

Oryzopsis melanocarpa, Muhl. Saint Cloud, *Campbell.*

Phalaris Canariensis, L. Winona county, *Holzinger.*

Azolla Caroliniana, Willd. Winona county *Holzinger.*

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PLANTS COLLECTED OR OBSERVED ON HUNTERS' ISLAND, BRITISH AMERICA, JULY 26 AND 27, 1886.

By L. H. Bailey, Jr.

Galeopsis tetrahit *L.* About the ruins of the block house.
Cornus stolonifera *Michx.* Singular forms.
Scirpus eriophorum *Michx.*
Carex lenticularis *Michx.* Along the shore, in clumps.
Carex tribuloides *Wahl.*, var. reducta *Bailey.* Very small form.
Nasturtium palustre *DC.*
Fragaria virginiana *Ehrh.*, var. illinoensis *Gray.*
Melampyrum americanum *Michx.*
Ranunculus aquatilis *L.* In clear lake water, from a hard bottom.
Solidago canadensis *L.*, var. procera *T. & G.*
Agrimonia eupatoria *L.*
Aster macrophyllus *L.*
Spiranthes gracilis *Bigelow.*
Alnus viridis *DC.*
Scutellaria lateriflora *L.*
Elymus canadensis *L.*
Geum nivale *L.*
Fraxinus americana *L.*
Fraxinus pubescens *Lam.*
Acer dasycarpum *Ehrh.*
Amelanchier ——?
Habenaria orbiculata *Torr.*
Lycopus virginiana *L.*
Œnothera biennis *L.*
Vaccinium pennsylvanicum *Lam.* Berries abundant and de licious.
Oryzopsis melanocarpa *Muhl.*
Oryzopsis canadensis *Torr.*
Poa serotina *Ehrh.*
Poa compressa *L.*
Agropyrum violaceum *Vasey.*
Muhlenbergia mexicana *Trin.*
Danthonia spicata *Beauv.*
Glyceria nervata *Trin.*
Glyceria fluitans *R. Br.*
Deyeuxia ——?
Agrostis scabra *Willd.*
Lysimachia stricta *Ait.*

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Alnus incana *Willd.*
Gaultheria procumbens *L.*
Solidago lanceolata *L.*
Myrica gale *L.*
Carex retrorsa *Schw.*
Populus tremuloides *Michx.*
Populus grandidentata *Michx.*
Populus balsamifera *L.*
Betula papyrifera *Marshall.*
Hordeum jubatum *L.*
Phleum pratense *L.*
Epilobium coloratum *Muhl.*
Epilobium spicatum *Lam.*
Agrostis vulgaris *With.*
Rubus strigosus *Michx.* Common and productive.
Chenopodium album *L.*
Chenopodium hybridum *L.*
Erigeron canadense *L.*
Pteris aquilina *L.*
Apocynum androsæmifolium *L.*
Diervilla trifida *Mœnch.*
Prunus pennsylvanica *L.* Very common.
Prunus virginiana *L.* Not common.
Corylus rostrata *Ait.*
Bromus ciliatus *L.*
Rhus glabra *L.*
Arctostaphylos uva-ursi *Spreng.*
Antennaria plantaginifolia *Hook.*
Anaphalis margaritacea *B. & H.*
Pinus resinosa *Ait.* Evidently the original timber.
Pinus strobus *L.* Not so common as the last.
Thuya occidentalis *L.* Mostly destroyed.
Linnæa borealis *Gronov.*
Eupatorium purpureum *L.*
Cicuta maculata *L.*
Pyrola chlorantha *Swartz.*
Polygonum cilinode *Michx.*
Salix rostrata *Rich.*
Salix humilis *Marshall.*
Salix petiolaris *Smith.*
Hypericum canadense *L.* Very small form.
Rosa sayi *Schw.*
Rosa blanda *Ait.*

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GEOLOGICAL AND NATURAL HISTORY SURVEY OF CANADA.
ALFRED R. C. SELWYN, C.M.G., LL.D., F.R.S., F.G.S., DIRECTOR.

CATALOGUE

OF

CANADIAN PLANTS.

PART V.—ACROGENS.

BY

JOHN MACOUN, M.A., F.L.S., F.R.S.C.,
Botanist and Naturalist to the Geological and Natural History Survey of Canada.

MONTREAL:
WILLIAM FOSTER BROWN & CO.
1890.

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PREFACE.

PART V.

In the Preface to Part IV. it was stated that Part V. would include the ferns and their allies and also the Musci and Hepaticæ. The addendum to the Parts already published had grown so large, however that it was thought better to change our expressed intention, and in the Part now issued—which completes Volume II.—we include an addendum bringing the Parts already published up to date. Part VI. will be published during the ensuing year, and it will include the Characeæ, Musci, and Hepaticæ, about 1000 species in all.

Since the publication of Part IV., we have made collections on Prince Edward Island, and on the mainland of British Columbia, as far east as the summit of the Gold Range; Dr. G. M. Dawson collected in British Columbia in 1888–9, and Jas. M. Macoun on the Athabasca, Clearwater, and Upper Churchill rivers in 1888, the results of these collections have been embodied in this Part. A number of collectors whose names will appear in the addendum have assisted me with notes and specimens, and to them hearty thanks are returned, and it is hoped that they and others will continue the good work. Communication has been kept up with specialists both in Europe and America, and the addendum will show the good results obtained.

Dr. Sereno Watson has examined many critical species, and has been of great assistance in many instances. Dr. N. L. Britton, of Columbia College, New York, has critically examined numerous genera, and is at present at work on others. Prof. Trelease, Director of the Shaw School of Botany, St. Louis, has examined our Geraniaceæ and various difficult genera, and Professors Coulter and Rose the whole of our Umbelliferæ, adding many new species and changing considerably the

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nomenclature. Mr. M. S. Bebb, of Rockford, Ill., has examined all our Willows and revised the nomenclature, much of that part of the addendum referring to the Willows being his work. Messrs. Bennett and Beeby have continued their work, and named our Potamogetons and Spargania. We have been enabled to make the changes in, and additions to, the genus Carex, by the use of Prof. Bailey's Memoir, published by the Torrey Botanical Club, and by his examination of our specimens collected during the past two years. Prof. F. Lamson Scribner has determined all the grasses collected in British Columbia in 1889, and other critical species. The changes and additions in the order Gramineæ, are either his or have been made at his suggestion. Dr. T. J. W. Burgess, our highest authority on Canadian Ferns, has prepared the orders Ophioglossaceæ and Filices.

JOHN MACOUN.

OTTAWA, May, 1880.

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Var. **vigens,** Bailey in Herb. Gray.

"Culm stout, thick, very spongy, constricted at the summit, nearly as thick as the ovate spike." (*Britton.*) In muddy places by ponds, Victoria Road and Mount Stewart, Prince Edward Island. 1888. In a pond on the road to Cedar Hill about one mile from Victoria, Vancouver Island. 1887. (*Macoun.*)

(2469.) **H. acuminata** (Muhl.) Nees.; Britton, Journ. N. York, Micros. Soc., X., 109.

H. compressa, Sulliv.; Macoun, Cat. IV., 96.

Specimens referred to *H. tenuis* (in Part IV., 97) from Salt Lake, Anticosti; east coast of Lake Nepigon; Lake Superior at Thunder Bay; marsh, Porcupine Mountains, Man.; and Moose Jaw Creek, Assiniboia, belong here.

(2471.) **H. intermedia,** Schultes.; Macoun, Cat. IV., 96.

In mud along the shore of Leamy's Lake, near its outlet at Hull Cemetery, near Ottawa. 1889. (*Macoun.*)

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(2505.) **C. capitata,** Linn.; Macoun, Cat. IV., 109.

Damp, grassy places, Methy River, Lat. 57°, N.W.T. 1888. (*J. M. Macoun.*)

(2507.) **C. dioica,** Linn.

Professor Bailey informs me that the specimens placed under this species in Part IV., 109, belong to *C. gynocrates.* This species is therefore cancelled, and references under it go to *C. gynocrates.*

(2524.) **C. Jamesii,** Schweinitz; Bailey, Mem. Torr. Bot. Club., I., 48.

References under *C. Steudelii*, Kunth, Part IV., 113, belong here.

(2528.) **C. Sartwellii,** Dew. Sill. Journ. XLIII., 90. (1842.)

References under *C. disticha*, Huds, Part IV., 114, belong here.

Prof. Bailey in Mem. Torr. Bot. Club, I., 8, says that "the American plant is abundantly distinct from the European *C. disticha*, Huds." Prof. Dewey and Dr. Boott thought otherwise, but we fully agree with Prof. Bailey in keeping them apart.

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Var. **occidentalis,** Bailey, MS. N. Var.

Head lighter coloured than in the species; spikes more pointed; scales thin, whitish, very sharp and as long as, or longer than the perigynium. Guichon Creek, Nicola Valley, B.C. 1888. (*Dawson.*) Borders of saline marshes around Kamloops, B.C. 1889. (*Macoun.*)

(2529.) **C. Douglasii,** Boott; Macoun, Cat. IV., 115.

Abundant and in fine fruit on the dry arid plain between the Ferry and the North Thompson, opposite Kamloops, B.C., June, 1889. (*Macoun.*)

(2530.) **C. marcida,** Boott; Macoun, Cat. IV., 115.

Quite common on the dry flats by the Thompson River at Spence's Bridge and Kamloops, B.C. 1889. (*Macoun,*)

Var. **alterna,** Bailey, MS. N. Var.

"Tall and very slender, the culm even flexuose; spikes small and scattered, the lower ones a half inch or more separated and the head often 2 inches long; perigynium lance-ovate, longer than in the species and more strongly nerved, especially on the outer side, and strongly stipitate." In dry gravelly soil along Shuswap Lake near Scotch Creek, B.C., June 18th, 1889. (*Macoun.*)

(2533.) **C. teretiuscula,** Good., var. **ampla,** Bailey, Mem. Torr. Bot. Club, I., 53.

"Very large and stout, growing three feet or more high in dense tufts; heads large (2 to 3 in. long), much branched, chaffy; perigynium twice larger than in the species, nerved on the back, shining at maturity, produced into a long beak." Quaking bog, on the border of Burnaby Lake, near Vancouver City, B.C., April 19th, 1880. (*J. M. Macoun.*)

(2543.) **C. Hookeriana,** Dewey; Bailey, Mem. Torr. Bot. Club, I., 14.

C. muricata, var. *gracilis,* Boott; Macoun, Cat. IV., 118.

"Very slender; head interrupted, castaneous, small, the spikes sometimes alternately arranged; bracts of the two or three lower spikes produced into long awns, which surpass the spikes; perigynium small, green, usually lightly nerved, gradually produced into a beak which is cut into sharp awl-like teeth." See Part IV. for distribution.

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(2545.) **C. Hoodii,** Boott; Bailey, Mem. Torr. Bot. Club, I., 14; Macoun, Cat. IV., 119.

C. muricata, Linn., var. *confixa,* Bailey; Macoun, Cat. IV., 119.

In thickets at Agassiz, B.C., May 14th, 1889. (*Macoun.*)

(2549.) **C. festiva,** Dew., var. **pachystachya,** Bailey, Mem. Torr. Bot. Club, I., 51.

C. festiva, Dew., var. *gracilis,* Macoun, Cat. IV., 120, in part.

"Culm more or less prolonged (1 to 3 ft.), flat and weak, longer than the lax leaves; heads small and globular or oblong, dull dark brown, the spikes often somewhat distinct, very short; perigynium spreading, about the length of, or somewhat longer than, the ovate-lanceolate muticous brown scale." Cedar Hill, near Victoria; Nanaimo; and Mount Mark, near Qualicum, Vancouver Island. (*Macoun.*) Alaska. (*Chamisso.*)

Var. **gracilis,** Olney; Macoun, Cat. IV., 120.

In grassy thickets at Agassiz, B.C., May 10th, 1889. (*Macoun.*)

(3192.) **C. iliota,** Bailey, Mem. Torr. Bot. Club, I., 15.

C. Bonplandii, Kunth? var. *minor,* Boott, Proc. Acad. Phila. (1863), 77.
C. Bonplandii, var. *angustifolia,* W. Boott, Bot. Calif. II., 233. (1880.)

"Distinguished from small forms of *C. festiva,* Dew., as follows:—Very slender and usually tall (6 in. to 19 in.), the head very small and globular or short-oblong ($\frac{1}{3}$ in. or less in diameter); perigynium completely marginless, thick below, stipitate, nerved, entirely smooth on the edges, the cylindrical and scarcely-cut beak projecting beyond the obtuse or muticous dark brown scale. The perigynia are considerably like those of the *C. canescens* group. This species stands midway between *C. festiva* and *C. heleonastes.*" By little pools on the mountains north of Griffin Lake, B.C., at an altitude of 6000 feet, Aug. 1889. (*Macoun.*)

(2551.) **C. synchnocephala,** Carey; Macoun, Cat. IV., 121.

In damp spots on the flat land north of the Ferry, at Kamloops, B.C., June 22nd, 1889. (*Macoun.*)

(2554.) **C. remota,** Linn.; Macoun, Cat. IV., 122.

Professor Bailey writes me that this species is of very doubtful occurrence in Canada, so we cancel it.

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(3193.) **C. Eleocharis,** Bailey, Mem. Torr. Bot. Club, I., 6.

"One of the *Vigneæ*, perhaps allied to *C. tenella*, Schk.; very slender but stiff, half a foot high, both leaves and culm filiform and smooth; spikes two or three, each bearing from one to three flowers, closely aggregated into a very small and apparently monostachyous head, evidently staminate above; perigynium short-ovate, turgid, flat on the inner face, marginless and nerveless, dull brown, beak entire or nearly so, as long as or longer than the thin hyaline scale." Collected on the Saskatchewan Plains, near Fort Carleton, in August, 1872. Col. Olney named it *C. glareosa*, and under this name it was distributed. It has never been seen since, but often looked for. (*Macoun.*)

(2557.) **C. canescens,** Linn., var. **polystachya,** Boott; Rich. Jour., II., 344.

C. arcta, Boott; Macoun, Cat. IV., 124, in part.

Erect and mostly strict, not glaucous, 1½ to 2½ feet high; leaves very lax and usually exceeding the culm; spikes oblong, green, more or less aggregated into a loose head, the lowest one or two subtended by a short and hyaline broad-based and pointed or caudate bract; perigynium more spreading than in the species.

All eastern references to *C. arcta*, in Part IV., belong here. The western to the next variety.

Var. **Oregana,** Bailey, Mem. Torr. Bot. Club, I., 75.

C. arcta, Boott; Macoun, Part IV., 125, in part.

"Head larger and more dense than in the var. *polystachya*, becoming brown; spikes loosely flowered, the perigynia sometimes spreading in a stellate manner; perigynium narrow, often almost linear-lanceolate, brown-nerved, sharp-edged and rough above." Very abundant in ditches at Hastings, B.C.; and Victoria and Nanaimo, Vancouver Island. (*Macoun.*) Cedar Hill, near Victoria, V. I. (*Fletcher.*) Vancouver City, Burrard Inlet, B.C. (*Prof. Fowler.*)

Var. **robustina,**

A very tall form growing in clumps in boggy places. Spikes 6 to 8, generally 7, often half an inch long, tapering at the base, lower spikes distant and peduncled, the latter four forming an oval head, lower with a short setaceous bract, whole head with a light silvery hue. In damp woods at Port Haney, B.C., May 1st, 1889. (*Macoun.*) Burnaby Lake, near Hastings, B.C., April, 1889. (*J. M. Macoun.*)

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Var. **brunnea,**

Low and slender, scarcely a foot high, growing in tufts in ditches. Spikes brown, scattered, 3 to 5, generally 4, small, but elongated, the upper often half staminate; lower bract seldom longer than the spike. The scattered light-brown, elongated, spikes distinguish this variety from all other forms of the species. Port Haney and Port Moody, B.C., May 3rd, 1889. (*Macoun.*)

(2565.) **C. Liddoni,** Boott; Macoun, Cat. IV., 128.

Fine specimens were collected at Lytton and Spence's Bridge on the Thompson River, B.C., May, 1889. (*Macoun.*)

(2566.) **C. pratensis,** Drej., var. **furva,** Bailey, MS.

C. pratensis, Macoun, Cat. IV., 128, in part.

"Spikes much larger than in the type (½ in. or more long), more loosely flowered, dark brown. The culms appear to be more sharply angled, also." (*Bailey.*) Not uncommon in damp meadows at Cedar Hill, Goldstream, and throughout southern Vancouver Island, May 27th and 31st, 1887. (*Macoun.*)

(2567.) **C. fœnea,** Willd., Enum. Pl. Hort. Berl., 957. (1809.)

C. adusta, Macoun, Cat. IV., 129, in part.

"Culm slender and often weak (1 to 2 feet high); head long and weak; spikes five to eight, small and silvery green, much contracted below and alternately disposed; perigynium varying from ovate to long-ovate, thin, much longer than the small achenium, prominently rough-margined, strongly many-nerved on both sides; bracts entirely wanting or very inconspicuous." In the valley of Eagle River at Griffin Lake, B.C., July 7th, 1889. (*Macoun.*)

Var. **perplexa,** Bailey; Mem. Torr. Bot. Club, I., 27.

C. adusta, Macoun, Cat. IV., 129, in part.

"Mostly taller and stouter than the species, the spikes larger and less attenuated or even truncate below, more approximate or even aggregated, the head erect or nearly so and the lowest bract sometimes prominent." Burnt woods, North Hastings, Ont., and near the Lake of the Woods. (*Macoun.*)

(2568.) **C. adusta,** Boott; Hook. Fl. II., 214.

References under *C. pinguis,* Bailey, Part IV., 129, belong here.

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(2572.) **C. straminea,** Willd.; Bailey, Mem. Torr. Bot. Club, I., 31.

C. straminea, var. *tenera,* Macoun, Cat. IV., 132.

This includes the lax forms hitherto included in var. *tenera.* In thickets at Agassiz and Shuswap Lake, B.C. 1889. (*Macoun.*)

Var. **brevior,** Dewey; Bailey, Mem. Torr. Bot. Club, I., 22.

References under *C. straminea* and var. *festucacea,* Macoun, Cat., IV., 131-132, belong here.

Var. **cumulata,** Bailey, Mem. Torr. Bot. Club, I., 23.

C. straminea, var. *alata,* Macoun, Cat. IV., 133.

"Culm very tall and stiff; spikes several to many (sometimes 25!), greenish, usually aggregated into a bunchy head, very densely flowered and squarely contracted at the base, short and pointed, spreading; perigynium appressed, the points therefore not conspicuous."

(3194.) **C. silicea,** Olney; Bailey, Mem. Torr. Bot. Club, I., 24.

C. straminea, var. *moniliformis,* Tuckerman; Macoun, Cat. IV., 133.

All references in Part IV., 133, under the above variety, belong here.

(2573.) **C. Preslii,** Steud.; Bailey, Mem. Torr. Bot. Club, I., 52.

C. leporina, L., var. *Americana,* Olney; Macoun, Cat. IV., 133.

Prof. Bailey says that the synonym *C. petasata,* Dew., should not have been placed here in Part IV. All our own specimens go here. Summit of Mount Queest, Gold Range, B.C. Alt. 6000 feet, 1889. (*J. M. Macoun.*) Gold Range, north of Griffin Lake, B.C. Alt. 6500 ft. 1889. (*Macoun.*)

(2574.) **C. bicolor,** Allioni; Macoun, Cat. IV., 134.

Of a specimen received from Mr. J. Brittain, Fredericton, New Brunswick, which we doubtfully referred here, Professor Bailey writes: "It has many of the characteristics of *C. bicolor,* but I should prefer to call it *C. aurea* until more material accumulates." It is retained here until New Brunswick collectors get more material. Upper Restigouche River, N.B., July, 1883. (*Brittain.*)

(2578.) **C. atrata,** Linn., var. **ovata,** Boott; Macoun, Cat. IV., 135.

"Habitually more slender than the species and usually lower, spikes small or oblong-ovate, reddish-brown, slenderly peduncled." This form

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includes all our herbarium specimens collected between the Atlantic Coast and the Rocky Mountains. Mountain specimens are placed under *C. atrata*, as they are identical with Greenland specimens, having the heads short peduncled and closely aggregated, while the scales are deep black without any tinge of red. The specimens referred to *C. atrata*, var. *nigra*, in Part IV., are placed with the species, and the variety disappears, as Prof. Bailey erects Olney's variety into a species named *C. nova*. All our specimens are more or less peduncled, and hence are excluded.

(2581.) **C. Parryana,** Dew.; Macoun, Cat. IV., 136.

In dry thickets along Shuswap Lake, at Scotch Creek, B.C., June, 1889. (*Macoun.*)

(2591.) **C. aurea,** Nutt., var. **celsa,** Bailey, Mem. Torr. Bot. Club, I., 75.

C. aurea, Nutt.; Macoun, Cat. IV., 138, in part.

"Taller than the species (15 to 20 in. high), and strict spikes large and compactly flowered, evenly cylindrical, longer peduncled." Somenos, and Horne Lake at Qualicum, Vancouver Island, 1887. (*Macoun.*)

(2592) For **C. albata,** Bailey, Macoun, Cat. IV., 139, read **C. ablata,** Bailey.

(2594.) **C. debilis,** Mx., var. **Rudgei,** Bailey, Mem. Torr., Bot. Club, I., 34.

References under *C. debilis*, Mx., Part IV., 139, belong here. "The common northern form." (*Bailey.*)

(2595.) **C. flava,** Linn., var. **viridula,** Bailey, Mem. Torr. Bot. Club, I., 31.

References under *C. Œderi*, Retz., Part IV., 140, belong here.

(2597.) **C. nudata,** W. Boott, var. **angustifolia,** Bailey, Mem. Torr. Bot. Club, I., 16.

References under *C. cæspitosa*, Linn., and var. *filifolia*, Boott, Part IV., 141, belong here.

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(2598.) **C. vulgaris,** Fries, var. **strictiformis,** Bailey, Mem. Torr. Bot. Club, I., 74.

C. vulgaris, Macoun, Cat. IV., 142, in part.

"Tall and lax (1½ to 2½ ft. high), the leaves long and narrow; staminate spike longer peduncled; pistillate spikes looser and often longer than in the species, the perigynia never being so densely packed and usually becoming browner." Lower St. Lawrence. (*Pringle,* fide *Bailey.*) North-west Arm Ferry and Point Pleasant, Halifax, N.S.; also at the mouth of Madalene River, Gaspé Coast, Q. (*Macoun.*)

(2599.) **C. decidua,** Boott; Macoun, Cat. IV., 143.

The specimens from Rogers Pass, Selkirk Mountains, belong here. It turns out to be a common species in British Columbia, and seems as much at home at 1100 feet altitude as at 6000. Mount Queest, Gold Range, B.C. (*J .M. Macoun.*) On the Gold Range north of Griffin Lake, alt. 6000 feet; shore of Shuswap Lake, and along the Thompson to Kamloops, quite common. (*Macoun.*) Professor Bailey writes that the present arrangement of specimens under this species is provisional. It is the Pacific representative of *C. vulgaris.*

(2600.) **C. invisa,** Bailey; Macoun, Cat. IV., 143.

Common along Queest Creek, Shuswap Lake, B.C. Alt. 5000 feet. (*J. M. Macoun.*) Mountains north of Griffin Lake, Gold Range, B.C. Alt. 6000; also along Spallumsheen Arm, at Sicamous, B.C. 1200 feet alt. 1889. (*Macoun.*)

(3195.) **C. variabilis,** Bailey, Mem. Torr. Bot. Club, I., 18.

C. aquatilis, Macoun, Cat. IV., 143, in part.

"Glaucous; mostly low (2 feet or less high), stout, culm sharply angled, roughish on the angles; leaves rather broad (as compared with *C. stricta,* Lam.); spikes three or four, short and stout (2 in., or less, long), borne near the top of the culm, erect, the lower one or two conspicuously attenuated at the base, and appearing clavate, the upper sessile, lower peduncled; bracts leaf-like and broad, the lower one or two equalling or exceeding the culm; perigynium small and broadly ovate, abruptly and very short beaked, nerveless, beak entire, green or whitish, conspicuously broader and usually shorter than the obtuse or muticous black scale." Old Wives' Lakes, Assiniboia; along Bow River at Calgary, Alberta. (*Macoun.*)

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Var. **elatior,** Bailey, l.c.

"Much taller, the leaves very long, and narrower; spikes longer (often 3 to 4 in.) and more slender, the lower much attenuated below, the upper bearing conspicuous staminate portions; bracts long and narrow." Open thickets at Morley, foot-hills of Rocky Mountains; Kicking Horse Lake, Rocky Mountains, and Donald, in the Columbia Valley; near Cedar Hill, Victoria, Vancouver Island. (*Macoun.*)

(2601.) **C. Nebraskensis,** Dew., var. **prævia,** Bailey, Mem. Torr. Bot. Club. I., 49.

References under *C. Jamesii*, Torrey, Part IV., 143, belong here, and the synonym *C. compacta*, should not have been placed under this species.

(3196.) **C. aperta,** Boott; Hook., Fl., II., 218, 219.

Fifty miles up the North Thompson River, above Kamloops, B.C. 1889. (*J. M. Macoun.*) By a lake near Fort St. James, northern British Columbia, June, 1875; abundant at Shuswap Lake and Agassiz, B.C. 1889. (*Macoun.*)

(2605.) **C. acutina,** Bailey, Mem. Torr. Bot. Club, I., 52.

C. acuta, Linn.; Macoun, Cat. IV., 146.

"A fine suite of specimens of *Carex acuta* given me by Arthur Bennett, Croydon, England, and a study of the species in various foreign herbaria, have enabled me to draw lines of separation between the European plant and the western plants which have been referred to it. *C. acutina* differs from *C. acuta* in the pale color of the plant and its lesser size and thin leaves, habitually smaller spikes, thinner and shorter perigynium, which is much less prominently nerved, and the lighter colored obtuse or muticous scales." (*Bailey.*) Lewes River, Lat. 62°, N.W.T., 1887. (*Dawson.*)

(2608.) **C. salina,** Wahl.; Bailey, Mem. Torr. Bot. Club, I., 45.

References under *C. salina*, Wahl., var. *mutica*, Wahl., Part IV., 147, belong here.

Var. **cuspidata,** Wahl.; Bailey, Mem. Torr. Bot. Club, I., 46.

References under *C. salina*, Wahl., Part IV., 146, belong here.

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(3197.) **C. Macounii,** A. Bennett; Bailey, Mem. Torr. Bot. Club, I., 45.

C salina, var. (?) *robusta,* Bailey; Macoun, Cat. IV., 147.

See description and notes on page 147.

(2611.) **C. cryptocarpa,** Meyer, var. **pumila,** Bailey, Mem. Torr. Bot. Club, I., 27.

C. cryptocarpa, Macoun, Cat. IV., 148 in part.

"Low (6 to 12 in. high); pistillate spikes, commonly two, short ($\frac{3}{4}$ in. or less), ovate or short-oblong; scales broad and muticous, but little longer than the much lighter colored perigynium.'" Queen Charlotte Islands. (*Dawson.*) Vicinity of Victoria, Vancouver Island. (*Fletcher.*) Gordon Head, Nanaimo, Qualicum and Comox, Vancouver Island; common in salt marshes along Burrard Inlet, B.C. 1889. (*Macoun.*)

(2613.) **C. Barbaræ,** Dew.; Macoun, Cat. IV., 148.

Quite common on the border of Burnaby Lake, and eastward in marshes to Griffin Lake, in the Gold Range, B.C. 1889. (*Macoun.*)

(2620.) **C. Raynoldsii,** Dew.; Macoun, Cat. IV., 151.

In a mountain valley north-west of Spence's Bridge, B.C. 1889. (*J. M. Macoun.*)

(2627.) **C. Salterensis,** Bailey, Mem. Torr. Bot. Club, I., 7.

C. vaginata, Tausch.; Macoun, Cat. IV., 153.

Professor Bailey separates this species from the European *C. vaginata* by its much more slender and less cæspitose habit, narrower leaves and less conspicuous sheaths, its alternately-flowered spikes, and its much smaller, less inflated, and conspicuously nerved perigynium. All references in Part IV., 153, belong here. Low ground near Hamilton, Ont., 1889. (*Burgess.*)

(2636.) **C. laxiflora,** Lam.; Macoun, Cat. IV., 155.

Professor Bailey has revised this species and finds the type to be what we have been calling *C. laxiflora,* var. *intermedia,* Boott. It embraces slender plants, characterized by narrow leaves (usually less than $\frac{1}{4}$ in. in width), a peduncled, or at least very conspicuous staminate spike, scattered pistillate spikes, which are very loose flowered and

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narrow ($\frac{1}{2}$ to $1\frac{1}{2}$ in. long), and very blunt perigynium. This includes both the type and var. *intermedia* of Part IV., 155. The synonymy may be considered cancelled, as it only refers in part to the type.

(2637.) **C. Hendersoni,** Bailey.

Not uncommon in woods and open thickets between Yale and the coast of British Columbia, 1889. (*Macoun.*)

(2638.) **C. laxiculmis,** Schweinitz; Bailey, Mem. Torr. Bot. Club, I., 47.

C. retrocurva, Dew.; Macoun, Cat. IV., 156, in part.

"Distinguished by its glaucousness." (*Bailey.*)

(2639.) **C. digitalis,** Willd., var. **copulata,** Bailey, Mem. Torr. Bot. Club, I., 47.

C. retrocurva, Macoun, Cat. IV., 156, in part.

"Larger than in the species, the culm weak and reclining, sometimes two feet long; leaves twice or thrice broader; spikes shorter and heavier; perigynium mostly larger. In aspect much like *C. laxiculmis,* but has no glaucousness, the upper spikes are shorter peduncled." (*Bailey.*) Wet ravines, London, Ont., June 24th, 1881. (*Burgess.*)

(2647.) **C. Pennsylvanica,** Lam., var. **vespertina,** Bailey, Mem. Torr. Bot. Club., I., 47.

C. Pennsylvanica, Macoun, Cat. IV., 158, in part.

"Habitually taller than the species, very slender; staminate spike commonly slimmer and usually very short-peduncled; pistillate spikes more separated and the lowest subtended by a leafy bract from one half inch to one inch long; perigynium mostly larger, more hairy, the beak longer and stouter." This form includes all our British Columbia and Vancouver Island specimens of *C. Pennsylvanica.*

(2648.) **C. communis,** Bailey, Mem. Torr. Bot. Club, I., 41.

Reference under *C. varia,* Muhl., Part IV., 159, except those given below, belong here.

Var. **Wheeleri,** Bailey, Mem. Torr. Bot. Club, I., 41.

C. varia, Macoun, Cat. IV., 159, in part.

"Mostly lower than the species; leaves very numerous, very broad and bright green, conspicuously shorter than the culm; staminate

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spike very short (usually only a fourth or a third of an inch long), closely sessile-inclined and inconspicuous; lowest bract leaf-like, often an inch or two long." On the sides of ravines, Truro, and Pirate's Cove, Strait of Canso, N.S. 1883. (*Macoun & Burgess.*)

(2649.) **C. varia,** Muhl., in Wahl. Kongl. Acad. Handl., XXIV., 159. (1803.) Bailey, Mem. Torr. Bot. Club, I., 40.

References under *C. Emmonsii*, Dewey, Part IV., 159, belong here.

(2650.) **C. Novæ-Angliæ,** Schw.; Bailey, Mem. Torr. Bot. Club, I., 44.

C. Novæ-Angliæ, Macoun, Cat. IV., 160, in part.

"Very slender, stoloniferous, the culms 6 to 8 inches high, about the length of the very narrow loose leaves; staminate spike quite distinct, erect and prominent, 3 to 8 lines long, mostly minutely peduncled, exceedingly narrow (about half a line broad); pistillate spikes usually two, the upper near the base of the staminate spike, the lower from ½ to 1 inch removed and short-stalked and subtended by a bract which nearly or quite equals the culm, both rather loosely three to six-flowered; radical spikes none; perigynium very narrow, often nearly oblanceolate, very thinly hairy, the sharp beak prominent; stigmas often two." In damp woods, Point Pleasant, Halifax, N.S. (*Burgess & Macoun.*) Grassy places at Cove Head and Brackley Point, Prince Edward Island. (*Macoun.*) Woods near St. Martin, N.B. 1888. (*Brittain.*)

(3198.) **C. deflexa,** Hornemann; Bailey, Mem. Torr. Bot. Club, I., 41.

C. Novæ-Angliæ, Macoun, Cat. IV., 160, in part.

"Very low, much tufted; culms from 1 to 6 inches long, setaceous more or less curved or spreading, little exceeding or shorter than the narrow leaves; staminate spike exceedingly minute and nearly always invisible in the head; pistillate spikes two or three, two to five-flowered, green or green-and-brown, all aggregated into a small head, the lowest one always more or less short-peduncled and subtended by a leafy bract, a half inch or less long; radical spikes very few or none; perigynium very small, much contracted below, sparsely hairy or nearly smooth, the flat beak exceedingly short." On sandy or rocky places near water, Gaspé Peninsula, Q. (*Macoun.*) Portage, Kent Co., N.B. (*Brittain.*)

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Var. **Deanii,** Bailey, Mem. Torr. Bot. Club, I., 42.

C. Novæ-Angliæ, Macoun, Cat. IV., 160, in part.

"Taller and laxer, the culms from 6 to 12 inches high and some or all prominently exceeding the long, loose, soft leaves; staminate spike much larger (2 to 3 lines long), erect or oblique, strictly sessile; pistillate spikes larger (four to eight-flowered), less aggregated or the lowest usually separated, though rarely more than a quarter of an inch removed; radical spikes usually numerous; bract mostly longer. Macnab's Island, Halifax Harbor, and Truro, N.S.; crevices of rocks, Brackley Point, Prince Edward Island; Sudbury Junction and Port Arthur, Ont. (*Macoun.*)

Var. **media,** Bailey, Mem. Torr. Bot. Club, I., 43.

C. Novæ-Angliæ, var. *deflexa*, Bailey; Macoun, Cat. IV., 160.

"Rather stiff, 4 to 12 inches high, in dense tufts; most of the culms somewhat exceeding the leaves; staminate spike prominent and erect, 3 to 5 lines long, sessile or very short peduncled; pistillate spikes two or three, all scattered, the uppermost at, or near, the base of the staminate spike, the lowest very prominently peduncled and subtended by a conspicuous bract which surpasses the culm, all rather compactly, three to eight-flowered, green, or brown-green; radical spikes usually abundant; perigynium much as in short-beaked forms of *C. umbellata*; scales large and sharp equalling or exceeding the perigynium." Grassy thickets, McLeod's Lake, and Telegraph Trail, B.C.; also on Mount Arrowsmith, Vancouver Island. Alt. 5500 feet. (*Macoun.*)

Var. **Rossii,** Bailey, Mem. Torr. Bot. Club, I., 43.

C. Novæ-Angliæ, var. *Rossii*, Bailey; Macoun, Cat. IV., 160.

"Stiff throughout, very strict, the leaves mostly equalling or exceeding the culms, the whole plant usually light-colored; staminate spike much as in the last, often larger; pistillate spikes one to three, distinct or sometimes scattered, loosely one to four-flowered; radical spikes usually abundant; scales very sharp, greenish-white or very rarely bearing an inconspicuous colored margin." In woods, from the Pacific coast to Spence's Bridge. (*Macoun.*)

(3199.) **C. ampullifolia,** Boott; Hook. Fl. II., 228, t. 226.

In abundance in and around springs in woods Vernon, near Lake Okanagan, B.C. 1889. (*Macoun.*)

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(2655.) **C. castanea,** Wahl.; Gray, Man., ed. VI., 603.

References under *C. flexilis,* Rudge, Part IV., 162, belong here.

(2658.) **C. capillaris,** Linn.; Macoun, Cat. IV., 163.

C. capillaris var. *Krausei,* Macoun, Cat. IV., 163.
C. Saskatchewana, Macoun, Cat., IV., 163.

Prof. Bailey having examined the specimens upon which these forms were founded, refers them both here.

(2671.) **C. lupulina,** Muhl. (1805); Bailey, Mem. Torr. Bot. Club, I., 11.

References under *C. lurida,* Wahl., Part IV., 167, belong here. Prof. Bailey shows that *C. lurida,* properly belongs to *C. tentaculata.*

Var. **Bella-villa,** Bailey, Mem. Torr. Bot. Club, I., 12.

References under *C. lurida,* var. *divergens,* Bailey, Part IV., 168, belong here.

Var. **pedunculata,** Dewey; Bailey, Mem. Torr. Bot. Club, I., 12.

References under *C. lurida,* var. *polystachya,* Bailey, Part IV., 168, belong here.

(2673.) Since writing the article under this number, Part IV., 168, we have received specimens of *C. Raeana* (named by Boott), from the British Museum, and can make nothing of it except an immature specimen of *C. oligosperma.* In the summer of 1888, J. M. Macoun collected on Methy Portage many specimens of both *C. oliogosperma* and *C. monile.* Prof. Bailey in Mem. Torr. Bot. Club, Vol. I., 39, makes *C. Raeana* a variety of *C. monile.* It is very probable that Boott had young specimens of *C. oligosperma* and *C. monile* before him when he characterized the species he named *C. Raeana.* The description of Prof. Bailey combines the spikes of *C. monile* and the leaves of *C. oligosperma,* and the compound is Boott's *C. Raeana.* Prof. Bailey writes me that "The type of *C. Raeana,* in Herb. Boott, is clearly different from *C. oligosperma.*" Whatever it is there is no evidence that it is a good species, and may be, as I state above a compound of *C. monile* and *C. oligosperma.*

(2674.) **C. miliaris,** Michx.; Bailey, Mem. Torr. Bot. Club, I., 35.

C. miliaris, Michx. · Macoun, Cat. IV., 199, in part.
C. Raeana, Boott; Macoun, Cat. IV., 168, in part.

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Below is Prof. Bailey's arrangement of the species, and I agree with his remark that "whatever future observers may decide as to the merits of the varieties I propose, the disposition suggested cannot fail to make the species better known." My difficulties are all cleared away by the arrangement, but var. *major* may be Michaux's type.

"Culm very slender but erect (12 to 18 in. high), smooth or slightly rough above on the angles; leaves narrow, often almost filiform, rough on the edges, mostly shorter than the culm; staminate spikes one or two, elevated an inch or more from the upper pistillate spike, very narrow, an inch or less long; pistillate spikes one to three, the upper one sessile and the lower very short-stalked, small (¾ in. or less long), the lowest subtended by a bract which usually exceeds it; perigynium very small, broadly or round-ovate or ovate-oblong; thin but firm in texture, bearing a nerve upon either angle, but otherwise nerveless or sometimes bearing a few very faint nerves near the base, rounded into a very short and terete beak which is either entire or somewhat erose; pistillate scales brown, lance-ovate, ending in a sharp whitish tip which nearly or quite equals the perigynium." Island in the Saguenay River, near Lake St. John, Que. (*A. H. Smith.*) Drury's Cove, St. John, N.B. (*Herb. Gray.*) Near St. John, N.B., 1877. (*Prof. Fowler.*) Newfoundland. (*La Pylaie, Herb. Gray.*)

Var. **obtusa,** Bailey, Mem. Torr. Bot. Club, I., 36.

"Culm mostly shorter and even more slender; pistillate spikes much smaller (from ⅓ in. long to smaller and globular), closely sessile; pistillate scale very obtuse, little if any more than half the length of the perigynium." Marguerite River, Que. (*A. H. Smith,* fide *Bailey.*) One small specimen received from Prof. Fowler, collected at Kennebeckasis, N.B, June 30th, 1878, is this variety. The others are the type. (*Macoun.*)

Var. **major,** Bailey, Mem. Torr. Bot. Club, I., 36.

"Much stouter (often fully two feet high), the culm thick and very sharply angled; leaves stout and canaliculate or involulate; staminate spikes short stalked; pistillate spikes one to five, mostly short-oblong, but often cylindrical (varying from ⅓ to 1½ in. long), stout and very dark and dull-brown, the lower one or two short-peduncled; scale varying from wholly obtuse to muticous." Lake Mistassini, N.E.T., 1885. (*J. M. Macoun.*) Jupiter River, Anticosti, Q., 1883. (*Macoun.*) Ungava Bay, Labrador, 1884. (*Turner.*)

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Var. (?) **aurea,** Bailey, Mem. Torr. Bot. Club, I., 37.

"Taller and mostly stouter than the species; staminate spikes two to three, mostly long-peduncled; pistillate spikes one or two, the upper sessile, the lower short-peduncled, often staminate at the apex, yellow or stramineous; perigynium thin and yellow as in *C. monile*, mostly prominently few-nerved, gradually produced into a conspicuous and more or less toothed beak, broader and usually longer than the light brown or whitish muticous scale." Kennebeckasis, N.B. (*Prof. Fowler*, fide *Bailey.*)

(2675.) **C. physocarpa,** Presl.; Macoun, Cat. IV., 169.

Sparingly along Spallumsheen Arm, at Sicamous, B.C., July, 1889. (*Macoun.*)

(2679.) **C. utriculata,** Boott; Hook. Fl. II., 221. (1840.)

References under *C. rostrata*, With., and its variety *utriculata*, Bailey, Part IV., 170, 171, belong here. Specimens referred here were collected in an immature state at Agassiz, B.C., May, 1889. (*Macoun.*)

(3200.) **C. exsiccata,** Bailey, Mem. Torr. Bot. Club, I. 6.

C. vesicaria var. *major*, Boott; Macoun, Cat. IV., 171, in part.

"Differs at once from *C. vesicaria* by its greater size and broader leaves, thicker and more nearly sessile spikes, and particularly by the much longer, lance-ovate, scarcely inflated, duller and strongly nerved perigynium, which is three or four times longer than the very narrow and muticous scale. In some of its forms it strongly suggests *C. trichocarpa*, Muhl., var. *aristata*, Bailey." Wet marshy places, near Victoria, Vancouver Island, 1885. (*Fletcher.*) Common and variable everywhere on Vancouver Island, 1887; on the mainland of British Columbia, from the coast to the Gold Range. (*Macoun.*)

Var. **globosa,** Bailey, Mem. Torr., Bot. Club, I., 7.

C. vesicaria var. *major*, Macoun, Cat. IV., 171, in part.

"More slender than the species, the leaves narrow ($\frac{1}{8}$ in. or less wide); spikes small (an inch or less long), more or less scattered, closely sessile, rusty in color; perigynium narrower, conspicuously spreading; scale hyaline and very small." Horne Lake, near Mount Mark, Vancouver Island. 1887. (*Macoun.*)

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Var. **pungens,** Bailey, Mem. Torr. Bot. Club, I., 7.

C. vesicaria, var. *major*, Macoun, Cat. IV., 171, in part.

"Slender; spikes narrowly cylindrical (the size of a pencil) one to two inches long, usually dark colored; scales firm, very sharp-pointed, half or a third as long as the the perigynium." Wet places at Cowichan, Nanaimo and Cameron Lake, Vancouver Island, 1887; common in swamps at Port Hammond, Agassiz, and eastward to Craigellachie, Eagle River, B.C. (*Macoun.*)

(2684.) **C. lurida,** Wahl.; Bailey, Mem. Torr. Bot. Club, I., 10.

References under *C. tentaculata*, Muhl., Part IV., 173, belong here.

(2687.) **P. Pseudo-Cyperus,** Linn., var. **Americana,** Hochst.; Bailey, Mem. Torr. Bot. Club, I, 54.

References under *C. Pseudo-Cyperus*, var. *comosa*, W. Boott, Part IV., 174, belong here.

674. PANICUM.

(3201.) **P. nitidum,** Lam., var. **barbulatum,** Michx.

Not uncommon at Kamloops and along the shores of Shuswap Lake, B.C. June, 1889. (*Macoun.*)

676. SPARTINA.

(2713.) **S. gracilis,** Trin.; Macoun, Cat. IV., 182.

Common in saline, boggy places at and around Kamloops, B.C., 1887. (*Macoun.*)

684. ALOPECURUS.

(2730.) **A. geniculatus,** Linn., var. **cæspitosus,** Scribner, MS.

A. Macounii, Vasey, Macoun, Cat. IV., 189 = *A. Howellii* and *A. saccatus*, Vasey.

"Culms low (2 to 6 in.), erect, panicles ¼ to 1 in. long, uppear sheaths sometimes inflated."

"The spikelets are the same as in *A. geniculatus*, Linn. Perhaps a couple of *sub-varieties* could be made on the varying length of the leaves, but we do not carry matters that far in this country." (*Scribner.*) On the old waggon road, at the first tunnel, as it rounds the bluff at

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Yale, B.C., May, 1889. We agree with Mr. Scribner in making this a var. of *A. geniculatus*. (*Macoun.*) Prof. Scribner remarks of var. *robustus*, Vasey, that it is just a stout grown plant of the species.

685. ARISTIDA.

(2736.) **A. fasciculata,** Torr.

A. purpurea, Nutt.; Macoun, Cat. IV., 190 = (*A. purpurea*, Nutt., var. = No. 336, Scribner, Montana Coll.)

Abundant at Spence's Bridge, B.C. 1889. (*Macoun.*)

686. STIPA.

(2739.) **S. Macounii,** Scribner, MS.

S. Richardsonii, Macoun, Cat. IV., 190.

"This is the *Stipa Richardsonii* of Gray's Manual, but I think *not of* Link. Your *S. Richardsonii*, var. *major*, is, I believe, *Stipa Richardsonii*, Link. I look upon the eastern plant, with its smaller panicle and spikelets, as a distinct species, and beg leave to name it *S. Macounii*." (*Scribner.*) This species includes all the references under *S. Richardsonii* in Part IV. (*Macoun.*)

(3202.) **S. Richardsonii,** Link.

S. Richardsonii, var. *major*, Macoun, Cat. IV., 191.

Not uncommon along the north shore of Shuswap Lake, near Scotch Creek, B.C., June, 1889. (*Macoun.*)

(2740.) **S. spartea,** Trin.; Macoun, Cat. IV., 191.

Abundant in many places on the hills around Kamloops and towards Nicola Lake, June, 1889. (*Macoun.*)

(2742.) **S. Columbiana,** Macoun, Cat. IV., 191.

Distinguished from *S. viridula* by its acute callus and short palea, this being scarcely half as long as its glume. (*Scribner.*) Not uncommon in tufts on the flats at Kamloops, B.C., June, 1889. (*Macoun.*)

S. —— ? (No. 18.)

"This = 613, Tweedy, 1885, and referred by me to *S. viridula*, from which I now think it is distinct. Must study it more. Perhaps it is not separable from *S. Columbiana*." (*Scribner.*) My Yale specimens

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Reprinted from BULLETIN OF THE TORREY BOTANICAL CLUB, Vol. XVII., No. 3.)

The Carices of the Upper Half of the Keweenaw Peninsula.

CAREX NOTES.—XIII.

BY L. H. BAILEY.

Mr. O. A. Farwell, Phœnix, Michigan, has sent me for determination a complete set of the carices which he has collected in his vicinity during the last four or five years, and the list affords so good a contribution to the knowledge of the geographical distribution of certain species, and is so large a record of the carex flora of a little known and interesting region, that I submit it for publication. Keweenaw County comprises the end of a small and narrow peninsula which juts into the main body of Lake Superior from the southward. It lies wholly above the 47th degree of latitude, and is the most northerly portion of the United States lying in or east of the Great Lakes. Its climate must be almost wholly dominated by Lake Superior. As in all regions adjacent to the Great Lakes, the flora is anomalous. It presents a curious admixture of northern and southern types, yet the northern types are not particularly marked. The writer has always observed this tendency of southern types to creep northwards along the Great Lakes, particularly on the shores opposite the direction of the prevailing winds. These winds, traversing the warmer area of the water, maintain the winter temperature on the shores upon which they blow at a higher point than it reaches upon the opposite side. Thus it appears to be true that the flora of the eastern shore of Lake Michigan has in it more plants of a southern type than has the western shore; at any rate, it is true that the western shore of the State of Michigan presents in its flora a warmer cast than does the eastern shore of the State. Mr. Farwell's plants come from the western side of the Keweenaw peninsula. It would be interesting to compare with them the plants of the eastern side.

The plants which seem to be particularly out of place so far north are *Carex squarrosa*, *C. virescens* var. *costata*, *C. Davisii*, and *C. Jamesii*. On the other hand, there are none which seem to be out of place so far south.

The range of *C. exilis* is much extended by the collection of this plant on the Keweenaw Penisula. The most western locality

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heretofore known for it is in Wayne Co., Western New York, where it has been collected by E. L. Hankerson. Mr. Farwell writes: "I first collected it in 1884 in a swamp between the Osceola and Calumet mines in Houghton Co., about twelve or thirteen miles from here, where it was very plentiful. I collected it again about six miles northwest of here, in Keweenaw Co., in 1887." *C. exilis* is a rare species, and this extension of range is important.

This region, in common with our whole northern boundary apparently, presents the most perplexing similarities in some of the varities of *C. tribuloides*, *C. scoparia*, and *C. straminea*.

The list comprises sixty-four entries. Following each entry, I have inserted the number which it bears upon Mr. Farwell's label.

C. pauciflora, Lightf. 519.
C. Michauxiana, Bœckl. 664, 665. Frequent in meadows.
C. intumescens, Rudge. 614. Common.
C. oligosperma, Michx. 661. Frequent.
C. utriculata, Boott. 663, 663a, 663b, 714, 714b. Common.
C. utriculata, Boott, var. *minor*, Boott, 714a, 715, 715a.
C. monile, Tuckm. 662, 716, 716a, 716b.
C. retrorsa, Schw. 609, 689. Common.
C. lurida, Wahl. (*C. tentaculata*, Muhl.) 703. Frequent.
C. hystricina, Muhl. 634, 688.
C. squarrosa, Linn. 699. Frequent.
C. scabrata, Schw. 651. Common.
C. Houghtonii, Torr. 632, 633.
C. filiformis, Linn 640. Frequent.
C. fusca, All. 615.
C. stricta, Lam. 569, 565a, 566, 566a, 566b, 566c. Frequent.
C. stricta × *filiformis*, Bailey, 613. The only station known for this well-marked hybrid.
C. crinita, Lam. 569, 568, 568a, 568b.
C. Magellanica, Lam. 608.
C. limosa, Linn. 606, 607.
C. virescens, Muhl. var. *costata*, Dewey, 697.
C. castanea, Wahl. 611.
C. arctata, Boott, 610.

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C. arctata, Boott, var. *Faxoni*, Bailey, 639.
C. arctata × *flexilis*, Bailey, 612.
C. debilis, Michx. var. *Rudgei*, Bailey, 610a, 637, 638, 638a.
C. gracillima, Schw. 655. Common.
C. gracillima, Schw. var. *humilis*, Bailey, 656.
C. Davisii, Schw. & Torr. 700.
C. Crawei, Dewey, 701.
C. granularis, Muhl. 704.
C. flava, Linn. 670, 671, 672, 672a 673. Common.
C. pallescens, Linn. 570.
C. laxiflora, Lam. var. *varians*, Bailey, 657, 713. Common.
C. Saltuensis, Bailey, 243.
C. aurea, Nutt. 635, 636. Common.
C. pedunculata, Muhl. 41. Common.
C. Pennsylvanica, Lam. Common in sand.
C. communis, Bailey, 652, 652a.
C. communis, Bailey, var. *Wheeleri*, Bailey, 653.
C. varia, Muhl. (*C. Emmonsii*, Dewey), 40.
C. deflexa, Hornem. var. *media*, Bailey, 244. Bluffs.
C. Jamesii, Schw. 698. Infrequent.
C. polytrichoides, Muhl. 520. Common.
C. stipata, Muhl. 522. Common.
C. vulpinoidea, Michx. 521. Common.
C. tenella, Schk. 523.
C. exilis, Dewey, 389.
C. echinata, Murr. var. *cephalantha*, Bailey, 555.
C. echinata, Murr. var. *microstachys*, Bœckl. 556.
C. canescens, Linn. 604.
C. canescens, Linn. var. *vulgaris*, Bailey, 605. Frequent in swamps.
C. canescens, Linn. var. *alpicola*, Wahl. 625. Frequent on dry, sterile hills.
C. canescens, Linn. var. *polystachya*, Boott, 624.
C. trisperma, Dewey, 524.
C. bromoides, Schk. 702. Infrequent.
C. Deweyana, Schw. 603, 603a.
C. tribuloides, Wahl. var. *reducta*, Bailey, 685.
C. tribuloides, Wahl. var. *Bebbii*, Bailey, 684, 684a, 683c.

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C. tribuloides, Wahl. var. *cristata*, Bailey, 683a.
C. scoparia, Schk. 601, 602a.
C. scoparia, Schk. var. *minor*, Boott, 602.
C. straminea, Willd. 683b.
C. straminea, Willd. var. *mirabilis*, Tuckm. 683.

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BRITISH MUSEUM (NATURAL HISTORY), SOUTH KENSINGTON.

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Lastræa Filix-mas Presl., var. *abbreviata* Bab. Grey Mare's Tail, Moffat Water (72).

Lycopodium annotinum L. On Little Craigindal (92), where it fruits freely. Elsewhere we have found it generally barren, or nearly so.

Chara fragilis Desv., var. *barbata* Gant. Peaty pools, Braemar (92). Name determined for us by Messrs. Groves.

CAREX RIGIDA Gooden. AND ITS VARIETIES.

By Prof. L. H. Bailey.

Mr. Arthur Bennett's appreciative review of my paper on the "Types of Carex" in this Journal for 1889 (p. 330), calls for some remarks and explanations concerning *C. hyperborea*, *C. vulgaris*, *C. rigida*, &c. Mr. Bennett is puzzled to know what becomes of the Scottish plant which has been called *C. rigida* var. *inferalpina* Laest., inasmuch as I referred the var. *inferalpina* of Laestadius to *C. vulgaris* var. *hyperborea*. I am unable to throw any light upon the question, as I have not seen the Scottish plant; but the *C. rigida* var. *inferalpina* at Copenhagen, which I saw, is the same as Drejer's *C. hyperborea*. It is evident, however, that the plant which I examined at Copenhagen is not Laestadius's type, for Laestadius described his plant as *C. saxatilis* var. *inferalpina*. But the specimen is undoubtedly authentic.

Mr. Bennett writes:—"The confusion with *C. hyperborea* has been great; the true plant is only given as Faroen and Icelandic by Nyman; but Drejer, in his 'Revisio' (1841), says, 'Lapponia, Laestad.! in herb. Hornem.'" But Drejer says more than this. He credits the plant to Greenland, Faroes, and Lapland. I have seen Drejer's types at Copenhagen, and they are the same as the American plants from Mt. Washington and northward, which have been referred to the same species. In fact, I have before me, as I write, a good sheet of Vahl's collection in Greenland, in 1830, a part, as I suppose, of the very specimens upon which Drejer founded *C. hyperborea*, and I also have specimens obtained in Greenland by Rosenvinge in 1888; all of these are clearly the same as the American plant. My object in comparing these plants with the American is to confirm the correctness of Boott's reference of Drejer's *C. hyperborea* to the species represented by the name *C. vulgaris*. There is so gradual a blending of types from the top of Mt. Washington, where *C. hyperborea* grows, to the adjacent sea-coast, where *C. vulgaris* is common, that there can be no doubt as to the specific identity of the two plants. But the same thing may be observed in Northern Europe.

"In one instance Prof. Bailey is not consistent, *i. e.*, in retaining *C. vulgaris* Fr., for *C. Goodenovii* Gay, which name is certainly three years anterior to that of Fries." This criticism is perfectly just; but the difficulty extends beyond these two names, and if reform is to be undertaken it must begin fifty years farther back.

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C. hyperborea is also older than *C. vulgaris*. It is the accepted practice, when combining specific names into a composite species, to erect the oldest specific name into the type. *C. rigida* should, therefore, be taken as the type of this species, for there can be no doubt, as Dr. Boott long ago showed, but that *C. rigida* and *C. vulgaris* are specifically one. Boott appears to have had it in mind to refer all the forms of the species to *C. rigida* rather than to *C. vulgaris*, for in his 'Illustrations' he frequently uses the former name in combination incidentally: but his characterizations are always drawn under the latter name.

The proper re-casting of the species would probably treat it about as follows:—

CAREX RIGIDA Gooden. Linn. Trans. ii. 193, t. 22 (1792).

C. saxatilis auct. Scand., not Linn.

C. saxatilis vars. *infuscata*, *pudica*, *lutosa*, Drejer, Revis. Crit. Car. Bor. 42, 43 (1841).

C. vulgaris var. *alpina* Boott, iii. 167 (1867).

C. Fyllæ Holm. Engl. Bot. Jahrbücher, viii. 294 (1887). Northern Europe, Scotland, and probably in the Rocky Mountain region of North America.

Var. BIGELOVII Tuckm. Enum. Meth. 19 (1843). *C. Bigelovii* Torr. Ann. N. Y. Lyc. i. 67 (1824). *C. Washingtoniana* Dewey, Sill. Journ. (I.), x. 272 (1826). *C. saxatilis* var. *Bigelovii* Torr. Monogr. 397 (1836). *C. saxatilis* var. *inferalpina* L. L. Laestadius, Loca Parall. Pl. 287 (1839). *C. hyperborea* Drejer, Revis. Crit. Car. Bor. 43 (1841). *C. Fridrichsthaliana* Steud. Pl. Cyper. 211 (1855). *C. dubitata* Dewey, Wood's Bot. 1861, 755. *C. vulgaris* var. *hyperborea* Boott, iii. 167 (1867). *C. Warmingii* Holm. Engl. Bot. Jahrbücher, viii. 294 (1887). Lapland, Faroe, (Scotland ?), Iceland. Greenland, and southward in America to Mt. Washington, and evidently also in the Rocky Mountains.

Var. GOODENOVII.—*C. acuta* β. Linn. Fl. Suec. ed. 2, 334 (1745). *C. acuta* a. *nigra* Linn. Sp. Pl. ed. 1, 978 (1753). *C. cæspitosa* Gooden. Linn. Trans. ii. 195, t. 21 (1792). *C. Goodenovii* Gay, Ann. Sci. Nat. (II.), xi. 191 (1839). *C. vulgaris* Fries, Mant. iii. 153 (1842). Northern Europe and Asia, and along the North Atlantic seaboard in North America.

Var. STRICTIFORMIS.—*C. Limula ?* Gray, Man. ed. 5, 582 (1867). *C. vulgaris* var. *strictiformis* Bailey, Mem. Torr. Club, i. 74 (1889). Near the seaboard from Pennsylvania northward to Canada.

Var. LIMULA. — *C. limula* Fries, Summa, 229 (1846). *C. vulgaris* var. *hyperborea* (*limula*) Boott, iii. 169 (1867). Scandinavia.

Var. ELYTROIDES. — *C. elytroides* Fries, Summa, 232 (1846). *C. vulgaris* var. *elytroides* Boott, iii. 168 (1867). Near the seaboard from Holland northward.

Var. TRICOSTATA.—*C. tricostata* Fries, Mant. iii. 152 (1842). *C. vulgaris* var. *tricostata* Boott. iii. 168 (1867). Scandinavia.

Var. JUNCEA. — *C. vulgaris* var. *juncea* Fries, Mant. iii. 154 (1842). *C. vulgaris* var. *juncella* Fries, Summa, 230 (1846). *C. angustifolia* Smith, Engl. Fl. 127 *teste* Boott. Great Britain and Northern Europe.

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Var. TERES.—*C, vulgaris* var. *teres* Boott, iii. 168, (1867). From Germany northward.

Var. TURFOSA. — *C. turfosa* Fries, Summa, 228 (1846). *C. vulgaris* var. *turfosa* Boott, iii. 169 (1867). Scandinavia.

Var. BRACTEOSA.—*C. vulgaris* var. *bracteosa* Bailey, Proc. Amer. Acad. Arts and Sci. xxii. 81 (1886). California. Greenland.

C. Gaudichaudiana Kunth, which Boott makes a variety of *C. vulgaris*, appears, from the little material which I have seen, to be at least a very doubtful variety of this species, and for the present it had probably better stand alone.

SUPPOSED HYBRIDITY IN *POTAMOGETON*.

By ALFRED FRYER.

WHEN I first began to study local forms of *Potamogeton* in the Fens, I was strongly prejudiced against regarding any of the generally accepted species of authors as of possible hybrid origin, but supposed that such species as are described in our standard works were in all cases "good species," which especially fulfilled the first theoretical demand of a species by being sterile with all other species of the genus. If on rare occasions a cross ever occurred, I held that the consequent offspring was absolutely barren, and incapable of continuing its race except by "extension" or growth from the original plant. Indirectly, these views were, if I remember rightly, advocated in the earlier notes of this series. By degrees, however, the local facts that presented themselves compelled me to regard *P. decipiens* as a hybrid between *P. lucens* and *P. perfoliatus*. This conclusion, by no means hastily made, induced me more closely to examine the local distribution and life-history of other so-called species of *Potamogeton*, and more especially to inquire into such circumstances as seemed to throw any light on their origin, or the relationship they bore one to another.

The facts observed in the course of these investigations, and the conclusions I have arrived at, form the substance of this note. By stating the facts fairly, I hope to enable the reader to correct for himself any errors of inference I may have fallen into.

In a previous note I stated that such forms as *P. heterophyllus* and *P. Zizii* were as variable when growing apart as when growing together. This statement was altogether erroneous. I did not then understand the difference between *states* of species and *varieties* of species,—between forms that are only temporary and speedily revert to the type, and forms that are permanent, for the life of the individual at least. But continued study of the living plant of one of our most apparently variable races of *P. Zizii*, showed that this multiform plant has no true variety, in the botanical sense of the word, but that all its forms may be produced on the same rootstock, often in a single season, or at most in the course of three or four seasons, and that these forms are mere states due to temporary causes, such

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as varying depth of water, or a greater or less degree of temperature, or whether they grow in stations crowded with other plants.

This race of *P. Zizii*, which grows in Westmoor, in the parishes of Chatteris and Doddington, extends over four or five square miles of the Fen, so that the constantly varying conditions of the numerous mill-drains and smaller ditches it inhabits afford unusually favourable opportunities for its study. Some ditch is constantly growing up, or some drain is deepened, or new ditches and drains are sometimes made, so that the deep-water *lucens*-like form of one year, or of early spring, may become the shallow-water *heterophyllus*-like form of another year, or of late summer in the same year even. Now on this west side of the Island of Chatteris no *Potamogeton heterophyllus* is at present to be found. *P. Zizii* has *lucens*, *natans* and *perfoliatus* as its usual companions.

Such forms as *P. varians* and *P. coriaceus*, both probable hybrids between *Zizii* and *heterophyllus*, therefore ought not to occur in Westmoor, and do not. But, on the other hand, a single plant of *P. decipiens* (*lucens* × *perfoliatus*), apparently a seedling, has been found, and also another *decipiens*-like form, in a single plant, which suggests *Zizii* × *perfoliatus*. One other probable hybrid has also occurred: *P. fluitans*, or *lucens* × *natans*.

This latter form occurred in two distant places, in single plants in each locality only, as if only recently introduced, or sprung from seeds.

Now if we turn to the east of Chatteris, we come to a district called Block Fen and Witcham Meadlands. In both these localities *P. Zizii* and *P. heterophyllus* are found constantly growing side by side, over an area of about the same extent as the Westmoor *P. Zizii* occupies. Here we find very different results; both *P. varians* and *P. coriaceus* occur plentifully, and *P. Zizii* and *P. heterophyllus* both produce numerous permanent forms, some of which are almost undoubtedly hybrids. In one drain between Block Fen and Witcham Meadlands ("Broker's Drain" of my labels), almost every group of *P. Zizii* and *P. heterophyllus* seems to be distinct from its neighbouring group; some forms appear to be exactly intermediate, others approach more nearly to one or other of the supposed parents; but few of them seem to be *states*, as I have not found them to revert to either of the type species, but they remain constantly distinct from one another through the most varying conditions. Some of these forms are no doubt true *varieties*, but others are quite as certainly hybrids, or double hybrids between *Zizii* and *heterophyllus*.

Although for a year or two past I had begun to suspect a remarkable form growing in Broker's Drain to be of hybrid origin, it was not until the summer of 1889 that I succeeded in obtaining what seems to be a direct proof of the hybrid parentage of any one individual.

For three or four years I had watched the growth of a slender plant, apparently a seedling, also growing in Broker's Drain, and had placed it in its immature state as a form allied to *P. heterophyllus* var. *fluctuans* of Tiselius; the plant had not flowered, nor

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CONTRIBUTIONS

FROM

THE U. S. NATIONAL HERBARIUM.

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ISSUED JUNE 30, 1891.

LIST OF PLANTS COLLECTED BY DR. EDWARD PALMER IN 1890 IN WESTERN MEXICO AND ARIZONA, AT

1. ALAMOS.
2. ARIZONA.

BY J. N. ROSE, *Assistant Botanist.*

PUBLISHED BY AUTHORITY OF THE SECRETARY OF AGRICULTURE.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
April 22, 1891.

SIR: I have the pleasure of presenting herewith for publication, the fourth number of a series of papers entitled "Contributions from the U. S. National Herbarium," prepared under my direction by J. N. Rose, Assistant Botanist.

Respectfully,

GEO. VASEY,
Chief of the Division of Botany.

Hon. J. M. RUSK,
Secretary of Agriculture.

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Pentstemon virgatus[1] Gray. "Corolla white with yellowish cast and a patch of purple on the upper part." Not common; in sandy places. Willow Springs. June 10 to 20. No. 493.

Pentstemon Wrightii Hook.? "Corolla beneath light-snuff color, the remainder violet." Grew on level places under pines and oaks. Willow Springs. July 5 and 6. No 614.

Verbena ciliata Benth. Collected near Fort Huachuca, 1889.

Dracocephalum parviflorum Nutt. Grows in rich moist bottoms. Willow Springs. June 10 to 20. No. 569.

Monarda fistulosa L., var. **media** Gray. Fort Apache. June 21 to 30. No. 579.

Monarda fistulosa L. Grows in profusion on grassy slopes and open level places. Willow Springs. July 5 and 6. No. 626.

Amarantus retroflexus L. Called "red-root." The White Mountain Apaches use the plant very much as food; the green herbage is cooked and the seeds gathered, parched and ground into flour, from which they make bread, mush, etc. Fort Apache. June 21 to 30. No. 587.

Chenopodium album L. Common. Used by the White Mountain Indians as a pot-herb. Fort Apache. June 21 to 30. No. 587.

Polygonum Bistorta L., var. **oblongifolium** Meisn. *fide, S. Coulter.* Willow Springs. June 10 to 20. No. 522.

Eriogonum alatum Torr. With more corymbose inflorescence than the type. Common on hillsides and river bottoms. Fort Apache. June 21 to 30. No. 597.

Comandra pallida A. DC. Willow Springs. June 10 to 20. No. 502.

Euphorbia montana Engelm. A very common plant along cañons. Fort Huachuca. April and May. No. 455.

Acalypha Lindheimeri Muell. Collected in an old garden. Fort Huachuca. April and May. No. 419.

Argythamnia mercurialina Muell. This plant is very common on dry and exposed places. Fort Apache. June 21 to 30. No. 581.

Tragia urticæfolia Michx. Willow Springs. June 10 to 20. No. 491.

Guilleminea densa Moq. Common in cañons. Fort Huachuca. April and May. No. 457.

Gomphrena cæspitosa Torr. Fort Huachuca. April and May. No. 423.

Juglans rupestris Engelm. Seen only in cañons. The young trees are quite ornamental. They grow here to a height of 30 feet, and are 1½ to 2½ feet in diameter. No. 416.

Alnus incana Willd., var. A large brushy topped tree 20 to 30 feet high and 12 to 18 inches in diameter. The Indians use the bark in tanning. Fort Apache. June 20 to 30. No. 602.

Quercus Emoryi Torr. The acorns of this oak are gathered in great quantities by the Mexicans and Indians. A small tree 30 feet high and 1½ feet in diameter. Fort Huachuca. April 26 to May 21. No. 459*a*.

Salix nigra Marsh., var. **venulosa** Anders, *fide* M. S. Bebb. "This varietal name is retained for forms which the species assumes in its distribution from Texas westward. Notwithstanding the inaccuracies of Anderson's description, these originated quite naturally from certain peculiarities in Wright's No. 1877, which peculiarities are now recognized as having resulted from an abnormal growth." M. S. Bebb.

Iris Missouriensis Nutt. Very common at Willow Springs. June 10 to 20. No. 499.

Sisyrinchium anceps L. Willow Springs. June 10 to 20. No. 490.

Sisyrinchium angustifolium Mill. Same habitat as the last. No. 490 *a*.

Allium Nuttallii Watson. Flowers white. The bulbs are eaten by the Indians and "settlers." Willow Springs. June 10 to 20. No. 574.

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[1] The specimens have on them an Æcidium, which Mr. J. W. Anderson tells me is a new species Æ. Palmeri.

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Lilium Parryi Watson. A free bloomer with sweet-scented canary-colored flowers. Grows in the cañons about Fort Huachuca. Pringle also got it near this station in 1884, and beside the type we have specimens from California collected by Parish. April and May. No. 478.

Smilacina[1] **amplexicaulis** Nutt. Willow Springs. June 10 to 20. No. 572.

Lemna trisulca L. Common in creeks at Willow Springs. June 10 to 20. No. 531.

Juncus[2] **xiphioides** Meyer., var. **montanus** Engelm. The specimens have only unopened flowers, but they undoubtedly belong here. No. 571.

Juncus tenuis Willd. Flowers not yet opened. This is the typical form with flowers not secund and with the lowest involucral leaf much exceeding the panicle. No. 550.

Juncus Balticus Dethard, var. **montanus** Engelm. Flowers just beginning to open. No. 555.

Juncus longistylis Torr. Flowers just beginning to open. No. 556.

Juncus longistylis Torr. Fruit not yet mature. No. 624.

Juncus tenuis Willd. No. 461*f*.

Juncus xiphioides Meyer, var. **montanus** Engelm. No. 467*a*.

Eleocharis palustris R. & S., var. **glaucescens** Gray. The specimens are without fruit, but appear to be a 3-styled form of this plant. No. 554.

Eleocharis palustris R. & S. The achenes are not yet mature, and the spikes in their young state are less sharply acute than is usual. No. 155.

Eleocharis montana R. & S. Plant only in flower and the determination made only on its general resemblance to the species. No. 459.

Scirpus pungens Vahl. No. 460.

Carex[3] **hystricina** Muhl., var. **angustior** Bailey, n. var. Whole plant whitish-green, tall and slender but erect; spikes one-half narrower than in the species, erect or ascending: perigynium less inflated, ascending.—Willow Springs, Arizona. No. 464. Pringle's 222 from Santa Rita Mountains is the same.

Carex teretiuscula Gooden. No. 553.

Carex marcida Boott. No. 552t. No. 552b is a single immature specimen. Mixed with this is *Carex filiformis* L., var. *latifolia* Boeckl.

Carex filiformis L. var. **latifolia** Boeckl. No. 549.

Carex echinata Murr. No. 548.

Carex Nebraskensis Dew., var. **prævia** Bailey. No. 547.

Carex nudata W. Boott. No. 546.

Carex aurea Nutt., var. **celsa** Bailey. Perigynia distinctly beaked. No. 545.

Carex occidentalis Bailey. No. 467.

Carex teretiuscula, Gooden., var. **ampla** Bailey. No. 462.

Carex hystricina, form. No. 464.

Eatonia obtusata Gray. Var. **robusta** Vasey. No. 466.

Eatonia Pennsylvanica Gray, var. **longiflora** Vasey. No. 467.

Eatonia[4] **Pennsylvanica** Gray, var. **major** Gray. 517.

Eatonia Pennsylvanica var. Fort Apache June 10 to 20. No. 577.

Aristida purpurea Nutt. Fort Apache June 21 to 30. No. 575.

Stipa leucotricha Trin. Fort Apache June 21 to 30. No. 576.

Calamagrostis neglecta Kunth. A common grass in wet soil. Willow Springs. July 5, 6. No. 616.

Kœleria cristata Pers. No. 562.

Kœleria cristata Pers, var. Willow Springs. No. 564.

---

[1] It is proper to state here that Mr. E. L. Greene, in a recent paper (Bull. Torr. Club, xv. 285 to 287), has replaced this genus by the older name *Uniflorum*, which makes this species *U. amplexicaule* Greene.

[2] The Juncaceæ and Cyperaceæ (except Carex) were determined by Mr. F. V. Coville.

[3] The CARICES were determined by Prof. L. H. Bailey.

[4] The Graminnæ were determined by Dr. Geo. Vasey.

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NEW CALIFORNIAN CARICES.

(Notes on Carex, xv.)

BY L. H. BAILEY.

The following new carices are decribed from collections submitted by the California Academy of Sciences:

CAREX OBNUPTA, n. sp.

Intermediate between *C. laciniata*, Boott, and *C. cryptocarpa*, Meyer. Tall and slender, 3–4 feet high, the culm stiff and sharply rough-angled; pistillate spikes about 3, scattered, the lower one or two long-peduncled and drooping, the upper short-peduncled or sessile, all 3 to 5 inches long, evenly and narrowly cylindrical, somewhat loose at the base, mostly prominently staminate at the apex; staminate spikes 2 or 3, considerably or much elevated; perigynium flat and orbicular-obovate, ridged on the edges, nerveless, usually minutely speckled with colored dots, the beak very small and short and minutely erose or entire, about the length of and twice or more broader than the thin and black-purple white-nerved sharp or bluntish scale.—San Mateo Co., *Kellogg;* Sierra Nevada (Donner), *Kellogg & Brannan;* Fort Point, San Francisco, *Bolander*.

This species lacks the stiff habit of growth of *C. laciniata*, as well as the laciniate scale and toothed, tapering perigynium, while the perigynium and short scale are wholly different from those of *C. cryptocarpa*. With the exception of the short scales the spikes of *C. obnupta* are very like those of *C. crinita* in appearance.

CAREX QUADRIFIDA, n. sp.

C. atrata, Linn., var. *erecta*,* W. Boott, Bot. Calif., ii, 239, at least mostly.

---

* *C. erecta* has been before used in the genus.

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Allied to *C. fusca*, All. Tall and stiff, 2 to 3 feet high, the culm smooth or nearly so; spikes usually 5, ½ to 1½ inches long, compact, the lowest one 2 to 4 inches, remote and short peduncled, the others usually shorter or more or less aggregated into a somewhat quadrifid head and sessile, or very nearly so, some of them often nearly globular, the terminal one staminate below for a-half or third its length; perigynium flat, obovate, splashed with purple, but the edges usually light-colored, nerveless, very abruptly rounded into a short and very slender erose beak, mostly longer and always broader than the purple and white-nerved sharp scale.—Mt. Dana, *Bolander*, 5046; *Brewer*, 1773.

Var. LENIS, n. var.

Usually lower, more slender, the leaves softer and more grass-like; perigynium white or nearly so throughout, usually minutely pitted, and the spikes shorter, often all nearly globular.—*Bolander*, 5046; *Kellogg & Harford*, 1080; Donner, *Kellogg*.

CAREX MONILE, Tuckm., var. PACIFICA, n. var.

C. vesicaria, W. Boot. Bot. Calif., ii, 252.

Leaves broad; spikes thick and short, 1½ inches or less long; perigynium very thin, strongly few-nerved, tapering, shining at maturity, 3 or more times longer than the thin and brownish obtuse or muticous scale.—*Brewer*, 1654; Donner, *Brandegee*.

A careful study of the American and European plants convinces me that they are distinct, and that *C, vesicaria*, Linn., does not occur in this country. *C. monile* var. *Pacifica*, to which I have referred all that has been called *C. vesicaria* in this country, differs from *C. vesicaria*, among other things, in its much stronger nerved perigynium which is more tapering in shape, and by its much

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shorter and blunt scales. This disposition greatly simplifies the study of our American *Vesicariæ*. *C. monile* is to America what *C. Vesicaria* is to Europe, but probably varying into more forms in its great range. Bœckeler (Linnæa xli, 319) unites *C. monile* with *C. vesicaria*, but there are differences enough to separate them, and their union would lead to great confusion.

I am unable to determine positively from the material I have examined if *C. monile* itself occurs in California. The *C. monile* of Bot. Calif., ii, 251, is certainly var. *colorata* Bailey (Bolander, 6211, v. s. Hb. Gray.) In the collection of the California Academy of Sciences are specimens referable to this variety. *Bolander*, 6200, from the Yosemite, referred by W. Boott. to *C. vesicaria* in Bot. Calif. is somewhat intermediate, but is evidently the variety *colorata*.

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LIST OF PLANTS OBSERVED GROWING WILD IN THE VICINITY OF CINCINNATI, O.

The following plants have come under my personal observation during the last eight or ten years. The nomenclature is according to Gray's Manual of Botany, sixth edition, 1890. I am responsible for the determinations, excepting a few, for which I am indebted to the following gentlemen: Walter Deane, Cambridge, Mass., for the determination of some of the difficult plants, which have been marked "*vide* Deane." Prof. L. H. Bailey has kindly gone over the Carices found in this locality. Professor F. L. Scribner has revised the Grasses, and favored me with a number of notes which are reproduced. Professor M. S. Bebb has named the Willows. Specimens marked "Crittenden" were collected at Crittenden, Grant Co., Ky., twenty-five miles south of this city, and have not been observed by me in this immediate neighborhood.

Plants that are numbered (either printed or written) *I have in duplicate, and they are offered in exchange.*

C. G. LLOYD, Court and Plum Streets,
CINCINNATI, OHIO.

October, 1891.

1 Clematis Virginiana, L.
2 Clematis Viorna, L.
3 Anemone Virginiana, L.
4 Hepatica acutiloba, DC.
5 Anemonella thalictroides, Spach.
6 Thalictrum dioicum, L.
7 Thalictrum.
A species observed, but not collected nor determined. Propably polygamum.
8 Ranunculus abortivus, L.
9 Ranunculus abortivus, var. micranthus, Gray.
10 Ranunculus recurvatus, Poir.
11 Ranunculus septentrionalis, Poir.
12 Ranunculus sceleratus, L.
13 Isopyrum biternatum, Torr. & Gray.
14 Delphinium tricorne, Michx.
An albino form of this species also collected.
15 Cimicifuga racemosa, Nutt.
16 Actæa alba, Bigel.
17 Hydrastis Canadensis, L.
Magnolia acuminata, Linn. (Crittenden.)
19 Liriodendron Tulipifera, L.
20 Asimina triloba, Dunal.
21 Menispermum Canadense, L.
22 Caulophyllum thalictroides, Michx.
23 Jeffersonia diphylla, Pers.
24 Podophyllum peltatum, L.
25 Sanguinaria Canadensis, L.
26 Stylophorum diphyllum, Nutt.
Argemone Mexicana, L.
28 Dicentra Cucullaria, DC.
29 Dicentra Canadensis, DC.
30 Corydalis flavula, DC.
Dentaria diphylla, L.
32 Dentaria laciniata, Muhl.
33 Cardamine hirsuta, Linn.
34 Cardamine rhomboidea, var. purpurea, Torr.
Arabis lævigata, Poir.
Arabis dentata, Torr. & Gray.
37 Draba verna, L.
Nasturtium officinale, R. Br.
39 Nasturtium palustre, DC.
Barbarea vulgaris, R. Br.
41 Sisymbrium officinale, Scop.
42 Thelypodium pinnatifidum, Watson.
Brassica nigra, Koch.
44 Capsella Bursa-Pastoris, Moench.
45 Lepidium Virginicum, L.
46 Polonisia graveolens, Raf.
47 Viola palmata, L., var. cucullata, Gray.
48 Viola pubescens, Ait.
49 Viola Canadensis, L.
50 Viola striata, Ait.
51 Viola tricolor, L., var. arvensis, Gray.
52 Solea concolor, Ging.
53 Saponiaria officinalis, L.
54 Silene stellata, Ait.
55 Silene Virginica, L.
Silene noctiflora, L. (Crittenden.)
Silene antirrhina, Linn.
58 Stellaria media, Smith.
59 Stellaria pubera, Michx.
60 Cerastium viscosum, L.
61 Cerastium nutans, Raf.
62 Cerastium vulgatum, L.
Portulaca oleracea, L.
64 Claytonia Virginica, L.
Hypericum perforatum, L.
66 Hypericum maculatum, Walt.
67 Hypericum mutilum, L.
68 Hypericum Drummondii, Torr. & Gray.
69 Hypericum nudicaule, Walt.
70 Malva rotundifolia, L.
71 Sida spinosa, L.
72 Abutilon Avicennæ, Gaertn.
73 Tilia Americana, L.
74 Tilia heterophylla, Vent.
75 Geranium maculatum, L.
76 Geranium Carolinianum, L.
77 Oxalis violacea, L.
78 Oxalis corniculata, L., var. stricta, Sav.

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79 Oxalis recurva, Ell.
(Vide Trelease).
80 Impatiens pallida, Nutt.
81 Impatiens fulva, Nutt.
Xanthoxylum Americanum, Mill.
Ailanthus glandulosus, Desf.
84 Celastrus scandens, L.
85 Euonymus atropurpureus, Jacq.
Ceanothus Americanus, L. (Crittenden.)
Vitis æstivalis, Michx. (Crittenden.)
88 Vitis cordifolia, Michx.
89 Ampelopsis quinquefolia, Michx.
90 Æsculus glabra, Willd.
91 Æsculus flava, Ait.
92 Acer saccharinum, Wang.
93 Acer saccharinum, var. nigrum, Torr. & Gray.
Acer dasycarpum, Ehrh.
Acer rubrum, L.
96 Negundo aceroides, Mœnch.
97 Staphylea trifolia, L.
Rhus typhina, L.
Rhus glabra, L.
100 Rhus Toxicodendron, L.
Polygala Senega, L. var. latifolia, Torr. & Gray. (Crittenden.)
102 Trifolium pratense, L.
103 Trifolium stoloniferum, Muhl.
104 Trifolium repens, L.
105 Melilotus officinalis, Willd.
106 Melilotus alba, Lam.
107 Medicago lupulina, L.
Psoralea Onobrychis, Nutt. (Crittenden.)
109 Robinia Pseudacacia, L.
110 Desmodium canescens, DC.
111 Desmodium Dillenii, Darlingt.
(Vide Deane.)
112 Desmodium paniculatum, DC.
(Vide Deane.)
Desmodium nudiflorum, DC.
114 Desmodium acuminatum, DC.
Desmodium pauciflorum, DC.
Lespedeza procumbens, Michx.
Vicia Caroliniana, Walt. (Crittenden.)
118 Strophostyles angulosa, Ell.
119 Amphicarpa monoica, Nutt.
120 Cercis Canadensis, L.
121 Cassia Marilandica, L.
Cassia Chamæcrista, L.
123 Gymnocladus Canadensis, Lam.
124 Gleditschia triacanthos, L.
125 Prunus Americana, Marshall.
Prunus Pennsylvanica, Linn. (very doubtful.)
127 Prunus serotina, Ehrh.
Gillenia stipulacea, Nutt. (Crittenden)
129 Rubus occidentalis, L.
130 Rubus villosus, Ait.
131 Rubus Canadensis, L.
132 Geum album, Gmelin.
133 Geum vernum, Torr. & Gray.
134 Fragaria Virginiana, var. Illinoensis, Gray.
Potentilla arguta, Pursh.
136 Potentilla Norvegica, L.
137 Potentilla Canadensis, L.
138 Agrimonia Eupatoria, L.
139 Rosa setigera, Michx.
140 Rosa humilis, Marsh.
Rosa rubiginosa, L. (Crittenden.)
142 Cratægus Oxyacantha, L.
143 Cratægus coccinea, L.
144 Cratægus coccinea, L. var. mollis, Torr. & Gray.
145 Cratægus punctata, Jacq.
146 Cratægus Crus-galli, L.
147 Heuchera Americana, L.
148 Hydrangea arborescens, L.
149 Ribes gracile, Michx.
(Vide Deane.)
150 Ribes Cynosbati, L.
151 Penthorum sedoides, L.
152 Sedum ternatum, Michx.
Rotala ramosior, Kœhne.
Jussiæa leptocarpa, Nutt.
(Determination doubtful.)
Ludwigia alternifolia, L.
Ludwigia palustris, Ell.
Epilobium coloratum, Muhl.
158 Œnothera biennis, L.
Gaura biennis, L.
160 Circæa Lutetiana, L.
Passiflora lutea, L.
162 Sicyos angulatus, L.
163 Echinocystis lobata, Torr. & Gray.
164 Mollugo verticillata, L.
165 Daucus Carota, L.
166 Caucalis Anthriscus, Hudson.
(Very common)
Angelica hirsuta, Muhl. (Crittenden.)
168 Pastinaca sativa, L.
170 Thaspium barbinode, Nutt.
171 Pimpinella integerrima, Benth. & Hook.
Bupleurum rotundifolium, L.
173 Cryptotænia Canadensis, DC.
174 Cicuta maculata, L.
175 Chærophyllum procumbens, Crantz.
Osmorrhiza brevistylis, DC.
177 Osmorrhiza longistylis, DC.
178 Erigenia bulbosa, Nutt.
179 Sanicula Marylandica, L.
Aralia quinquefolia, Decsne. & Planch.
Aralia racemosa, L.
182 Cornus florida. L.
Cornus. (Species doubtful.)
184 Nyssa sylvatica, Marsh.
185 Sambucus Canadensis, L.
Viburnum acerifolium, L. (Crittenden.)
187 Viburnum prunifolium, L.
Triosteum angustifolium, L.
189 Symphoricarpos vulgaris, Michx.
190 Houstonia cærulea, L.
Houstonia purpurea, L.
Cephalanthus occidentalis, L.
Spermacoce glabra, Michx.
Galium trifidum, Linn.
195 Galium Aparine, L.
196 Galium circæzans, Michx

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197 Galium concinnum, Torr. & Gray.
198 Galium triflorum, Michx.
199 Valeriana pauciflora, Michx.
Valerianella radiata Dufr. (Crittenden.)
201 Dipsacus sylvestris, Mill.
202 Vernonia fasciculata, Michx.
203 Eupatorium purpureum, Linn.
204 Eupatorium altissimum, Linn.
Eupatorium perfoliatum, L.
206 Eupatorium ageratoides, L.
207 Eupatorium cœlestinum, L.
208 Solidago cæsia, L.
209 Solidago latifolia, L.
210 Solidago serotinas, Ait.
211 Solidago Canadenis, L.
212 Solidago lanceolata, L.
213 Aster corymbosus, Ait.
214 Aster Novæ Angliæ, L.
215 Aster Shortii, Hook.
216 Aster cordifolius, L.
217 Aster ericoides, Linn. var villosus, Torr. & Gray.
218 Aster diffusus, Ait.
219 Aster paniculatus, Lam.
(Vide Deane.)
220 Aster prenanthoides, Muhl.
221 Erigeron Canadensis, L.
222 Erigeron annuus, Pers.
223 Erigeron strigosus, Muhl.
224 Erigeron Philadelphicus, L.
225 Antennaria plantaginifolia, Hook.
226 Gnaphalium polycephalum, Michx.
227 Gnaphalium uliginosum, L.
228 Gnaphalium purpureum, L.
229 Polymnia Canadensis, L.
Polymnia Uvedalia, L.
Silphium trifoliatum, L.
Silphium perfoliatum, L.
233 Ambrosia trifida, L.
234 Ambrosia artemisiæfolia, L.
Xanthium spinosum, L.
236 Xanthium Canadense, Mill.
237 Eclipta alba, Hassk.
Heliopsis lævis, Pers. (Crittenden)
239 Rudbeckia triloba, Linn.
240 Rudbeckia laciniata, L.
241 Rudbeckia hirta, L.
Helianthus giganteus, L.
(Vide Deane.)
243 Helianthus strumosus, L.
(Vide Deane.)
Helianthus.
(Species not determined.)
245 Actinomeris squarrosa, Nutt.
Coreopsis trichosperma, Michx.
(Vide Deane.)
247 Bidens frondosa, L.
248 Bidens connata, Muhl.
249 Bidens chrysanthemodies, Michx.
250 Bidens bipinnata, L.
251 Galinsoga parviflora, Cav.
252 Helenium autumnale, L.
253 Dysodia chrysanthemodies, Lag.
254 Anthemis Cotula, DC.
255 Achillea Millefolium, L.
256 Chrysanthemum Leucanthemum, L.
Artemisia vulgaris, L.
Artemisia biennis, Willd.
259 Artemisia annua, L.
(Vide Deane.)
260 Senecio aureus, L.
261 Cacalia reniformis, Muhl.
262 Cacalia atriplicifolia, L.
263 Arctium Lappa, L.
264 Erechtites hieracifolia, Raf.
Cnicus lanceolatus, Hoffm.
Cnicus altissimus, Willd. (Crittenden.)
267 Cnicus altissimus, Willd. var. discolor, Gray.
Cnicus arvensis, Hoffm.
269 Onopordon Acanthium, L.
Hieracium scabrum, Michx.
Prenanthes altissima, L.
272 Taraxacum officinale, Weber.
273 Lactuca Scariola, L.
274 Lactuca Canadensis, L.
275 Lactuca acuminata, Gray.
276 Sonchus oleraceus, L.
277 Sonchus asper, Vill.
Lobelia leptostachys, A. DC. (Crittenden.)
279 Lobelia syphilitica, L.
280 Lobelia inflata, L.
281 Specularia perfoliata, A. DC.
282 Campanula Americana, L.
Monotropa uniflora, L.
Dodecatheon Meadia, L. (Crittenden.)
Steironema lanceolatum, Gray.
Steironema lanceolatum, var. hybridum, Gray.
Steironema ciliatum, Raf.
288 Lysimachia quadrifolia, L.
Lysimachia nummularia, L.
Anagallis arvensis, L.
Samolus Valerandi. L. var. Americanus, Gray.
Diospyrus Virginiana, L. (Crittenden)
293 Fraxinus Americana, L.
Fraxinus quadrangulata, Michx.
295 Apocynum androsæmifolium, L.
296 Apocynum cannabinum, L.
Asclepias incarnata, L.
298 Asclepias phytolaccoides, Pursh.
Asclepias quadrifolia, L.
300 Enslenia albida, Nutt.
Gonolobus obliquus, R. Br.
Sabbatia angularis, Pursh. (Crittenden.)
Gentiana——— (Crittenden.)
A species observed but not collected nor determined.
Frasera Carolinensis, Walt., (Crittenden.)
305 Phlox paniculata, L.
306 Phlox divaricata, L.
307 Polemonium reptans, L.
308 Hydrophyllum macrophyllum, Nutt.
Hydrophyllum Canadense, L.

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310 Hydrophyllum appendiculatum, Michx.
311 Phacelia Purshii, Buckley.
Heliotropium Indicum, L.
313 Cynoglossum officinale, L.
Cynoglossum Virginicum, L. (Crittenden.)
315 Echinospermum Virginicum, Lehm.
Echinospermum Lappula, Lehm.
Mertensia Virginica, DC.
318 Lithospermum arvense, L.
Lithospermum latifolium, Michx.
320 Ipomœa lacunosa, L.
321 Convolvulus sepium, L.
Convolvulus spithamæus, Linn. (Crittenden.)
323 Cuscuta arvensis, Beyrich. (Vide Watson.)
324 Solanum nigrum, L.
325 Solanum Carolinense, L.
326 Physalis Virginiana, Mill. (Vide Deane.)
Physalis angulata, L.
Physalis (A species not determined.)
Nicandra physaloides, Gaertn.
Lycium vulgare, Dunal.
Datura Stramonium, L.
Verbascum Thapsus, L.
333 Verbascum Blattaria, L.
Verbascum Thapsus by Blattaria.
A single specimen of an undoubted hybrid, collected near Norwood, O., summer of 1890.
335 Linaria vulgaris, Mill.
336 Scrophularia nodosa, L., var. Marilandica, Gray.
Collinsia verna, Nutt.
Collinsia parviflora, Dougl. (Crittenden.)
Pentstemon pubescens, Solander.
340 Pentstemon lævigatus, Solander.
341 Mimulus ringens, L.
Mimulus alatus, Ait.
343 Conobea multifida, Benth.
344 Gratiola Virginiana, L.
Ilysanthes riparia, Raf.
Veronica Virginica, L.
347 Veronica serpyllifolia, L.
348 Veronica peregrina, L.
349 Veronica arvensis, L.
Seymeria macrophylla, Nutt.
351 Gerardia tenuifolia, Vahl.
Pedicularis Canadensis, L.
353 Epiphegus Virginiana, Bart.
Conopholis Americana, Wall. (Crittenden.)
Aphyllon uniflorum, Gray.
356 Tecoma radicans, Juss.
357 Ruellia strepens, L.
Dianthera Americana, L.
359 Verbena urticæfolia, L.
Verbena stricta, Vent.
Verbena bracteosa, Michx.
362 Lippia lanceolata, Michx.
363 Phryma Leptostachya, L.
364 Isanthus cæruleus, Michx.
365 Teucrium Canadense, L.
366 Collinsonia Canadensis, L.
367 Mentha viridis, L.
368 Mentha piperita, L.
369 Mentha Canadensis, L.
370 Lycopus Virginicus, L.
371 Lycopus sinuatus, Ell.
372 Pycnanthemum muticum, Pers. var. pilosum, Gray. (Vide Deane.)
Calamintha Clinopodium, Benth.
Melissa officinalis, L.
375 Hedeoma pulegioides, Pers.
Salvia lyrata, L. (Crittenden.)
377 Monarda fistulosa, L.
Blephilia ciliata, Raf. (Crittenden.)
379 Blephilia hirsuta, Benth.
380 Lophantus nepetoides, Benth.
381 Nepeta Cataria, L.
382 Nepeta Glechoma, Benth.
383 Scutellaria lateriflora, L.
Scutellaria versicolor, Nutt.
Scutellaria canescens, Nutt.
Scutellaria nervosa, Pursh.
387 Brunella vulgaris, L.
388 Synandra grandiflora, Nutt.
Marrubium vulgare, L.
390 Leonurus Cardiaca, L.
391 Lamium amplexicaule, L.
Stachys aspera, Michx. var. glabra, Gray.
393 Stachys cordata, Riddell.
394 Plantago major, L.
395 Plantago lanceolata, L.
396 Plantago Patagonica, Jacq. var. aristata, Gray.
Plantago Virginica, L.
Oxybaphus nyctagineus, Sweet.
Anychia dichotoma, Michx.
400 Anychia capillacea, DC.
401 Amarantus paniculatus, L.
402 Amarantus retroflexus, L.
403 Amarantus albus, L.
404 Amarantus spinosus, L.
405 Acnida tuberculata, Moq.
406 Chenopodium urbicum, L. (Vide Deane.)
407 Chenopodium murale, L. (Vide Deane.)
Chenopodium Boscianum, Moq.
409 Chenopodium album, L.
Chenopodium glaucum, L.
411 Chenopodium ambrosioides, Linn.
412 Atriplex patulum, L.
413 Phytolacca decandra, L.
414 Rumex altissimus, Wood.
415 Rumex crispus, L.
416 Rumex obtusifolius, L.
417 Rumex Acetosella, L.
418 Polygonum aviculare, L.
419 Polygonum erectum, L.
420 Polygonum lapathifolium, L. var. incarnatum, Watson.
421 Polygonum Pennsylvanicum, L.
Polygonum orientale, L.
423 Polygonum Persicaria, L.
424 Polygonum Hydropiper, L.
425 Polygonum acre, HBK.

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426 Polygonum Virginianum, L.
427 Polygonum sagittatum, Linn.
428 Polygonum Convolvulus, L.
429 Polygonum dumetorum, L., var. scandens, Gray.
430 Asarum Canadense, L.
Aristolochia Serpentaria, L.
432 Sassafras officinale, Nees.
433 Lindera Benzoin, Blume.
Phoradendron flavescens, Nutt.
435 Euphorbia maculata, L.
436 Euphorbia Preslii, Guss.
Euphorbia marginata, Pursh.
438 Euphorbia corollata, L.
439 Euphorbia dentata, Michx.
440 Euphorbia obtusata, Pursh.
Euphorbia commutata, Engelm. (Crittenden.)
442 Phyllanthus Carolinensis, Walt.
Croton capitatus, Michx.
444 Acalypha Virginica, L.
445 Ulmus fulva, Michx.
446 Ulmus Americana, Linn.
447 Celtis occidentalis, L.
Cannabis sativa, L.
Humulus Lupulus, L.
450 Morus rubra, L.
Urtica gracilis, Ait.
452 Laportea Canadensis, Gaudichaud.
453 Pilea pumila, Gray.
454 Bœhmeria cylindrica, Willd.
455 Parietaria Pennsylvanica, Muhl.
456 Platanus occidentalis, L.
Juglans nigra, L.
Juglans cinerea, L.
Carya sulcata, Nutt.
Carya tomentosa, Nutt.
Carya alba, Nutt.
462 Carya amara, Nutt.
463 Corylus Americana, Walt.
Ostrya Virginica, Willd.
465 Carpinus Caroliniana, Walter.
466 Quercus alba, L.
467 Quercus macrocarpa, Michx.
468 Quercus bicolor, Willd.
469 Quercus Prinus, Linn.
470 Quercus Muhlenbergii, Engelm.
471 Quercus rubra, Linn.
472 Quercus coccinea, Wang.
473 Quercus coccinea, Wang. var, tinctoria, Gray.
Quercus.
475 Quercus imbricaria, Michx.
Fagus ferruginea, Ait.

THE WILLOWS.

By PROF. M. S. BEBB.

The following list of Willows, with the exception of Salix purpurea, were submitted to Prof. M. S. Bebb, and named by him. It is to be regretted that I was not in possession of a more complete set of these plants, as I believe that there are a number of willows growing along our streams that have not been catalogued from this neighborhood.

Salix sericea, Marsh.
Salix cordata, Muhl.
Salix longifolia, Muhl.
Salix alba, L., var. vitellina, Koch.
Salix discolor, Muhl.
Salix nigra, Marsh.
Salix purpurea, Linne.
Populus monilifera, Ait.
Liparis liliifolia, Richard.
Aplectrum hiemale, Nutt. (Crittenden.)
Corallorhiza.
Orchis spectabilis, Linn. (Crittenden.)
Cypripedium pubescens, Willd. (Crittenden.)
Sisyrinchium anceps, Cav. (Vide Deane.)
Hypoxis erecta, L.
492 Dioscorea villosa, L.
Smilax glauca, Walt.
494 Smilax herbacea, L.
Smilax ecirrhata, Watson.
496 Smilax hispida, Muhl.
Allium tricoccum, Ait.
498 Allium cernuum, Roth.
Allium Canadense, Kalm.
500 Camassia Fraseri, Torr.
Polygonatum biflorum, Ell.
Polygonatum giganteum, Dietrich.
503 Asparagus officinalis, L.
504 Smilacina racemosa, Desf.
Uvularia grandiflora, Smith.
Erythronium Americanum, Ker.
507 Erythronium albidum, Nutt.
Lilium superbum, L. (Crittenden.)
509 Trillium sessile, L.
510 Trillium erectum, L.
511 Commelina nudiflora, Linn.
512 Tradescantia Virginica, L.
513 Tradescantia Virginica, L. var. flexuosa, Watson.
514 Juncus effusus, L.
515 Juncus tenuis, Willd.
516 Juncus nodosus, L. var. megacephalus, Torr.
517 Luzula campestris, DC.
Typha latifolia, L.
519 Arisaema triphyllum, Torr.
520 Arisaema Dracontium, Schott.
521 Acorus Calamus, L.
Spirodela polyrrhiza, Schleid.
Alisma Plantago, L. (Crittenden.)
Sagittaria variabilis, Engelm.
Potomogeton.
526 Cyperus diandrus, Torr.
Cyperus aristatus, Rottb.
528 Cyperus strigosus, L.
529 Kyllinga pumila, Michx.
530 Eleocharis ovata, R. Br.
531 Fimbristylis autumnalis, Roem. & Schult.
532 Scirpus pungens, Vahl.
533 Scirpus atrovirens, Muhl.
534 Eriophorum lineatum, Benth. & Hook.

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THE CARICES.

By PROF. L. H. BAILEY.

The following Carices were all submitted to Prof. L. H. Bailey.

535 Carex lupulina, Muhl.
536 Carex stenolepis, Torr.
537 Carex triceps, Michx. var. hirsuta, Bailey.
538 Carex Davisii, Schwein. & Torr.
539 Carex granularis, Muhl.
540 Carex oligocarpa, Schkuhr.
Carex laxiflora, Lam.
Carex laxiflora, Lam. var. striatula, Carey.
543 Carex laxiflora Lam. var. latifolia, Boott.
Carex laxiflora, Lam. var. patulifolia, Carey.
545 Carex Careyana, Torr.
546 Carex varia, Muhl.
547 Carex pubescens, Muhl.
548 Carex Jamesii, Schwein.
549 Carex conjuncta, Boott.
550 Carex vulpinoidea, Michx.

"I have always thought this form worthy of varietal distinction." L. H. BAILEY.

551 Carex rosea, Schkuhr.
552 Carex sparganioides, Muhl.
552a Carex cephalophora, Muhl.
553 Carex muricata, Linn.

A plant of this locality is cited in Professor Bailey's Synopsis, No. 140.

THE GRASSES.

By PROF. F. L. SCRIBNER.

The following Grasses were submitted to Prof. F. L. Scribner, and the notes which he has kindly furnished, are reproduced.

554 Spartina cynosuroides, Willd.
555 Paspalum setaceum, Michx.
556 Paspalum læve, Michx.
557 Panicum glabrum, Gaudin.

"This is correctly named, but your specimens are taller and more slender, and the spikes rather longer than usual. It is a form intermediate between the species and Dr. Gattingen's var. Mississippiense." SCRIBNER.

558 Panicum sanguinale, L.
559 Panicum proliferum, Lam.
560 Panicum capillare, L.
561 Panicum latifolium, L.

"Your Panicum latifolium, L., is essentially what Dr. Vasey has named var. molle of that species. The spikelets are those of P. latifolium, but the leaves are very narrow in proportion to their length, much longer and narrower than in any of my specimens of the species. The leaves approach those of the Panicum clandestinum (i. e. of Dr. Gray's var. pedunculatum.) Again your plant is scarcely different(it is more slender and the sheaths are smoother) from what I received from Dr. Chapman under the name of Panicum scoparium, Muhl,—Ell. So. Flora. The inflorescence and size of spikelets are exactly the same. I would not name the grass P. scoparium, Muhl, but let it go for the present as a variety of P. latifolium." SCRIBNER.

562 Panicum dichotomum, L.

"The grass you name Panicum dichotomum belongs to that species, if we admit it at all. Chapman does not, and would refer your grass to P. nitidum. For the present I would name it P. dichotomum, L., var. pubescens." SCRIBNER.

563 Panicum Crus-galli, L.
Setaria glauca, Beauv.
565 Setaria viridis, Beauv.
566 Setaria Italica, Kunth.
567 Leersia Virginica, Willd.
568 Leersia oryzoides, Swartz.
569 Andropogon Sorghum, Boot, var. Halapensis, Hack.

This plant, which is of the Southern type and not included in Gray's Manual, is well established in several localities around Cincinnati. I am indebted for its name to Prof. F. L. Scribner.

Andropogon.

I have noticed a species of this flowering late in the Fall, but I have never collected it. I think, however, it is the Andropogon scoparius.

571 Phalaris arundinacea, L.
572 Anthoxanthum odoratum, L.
573 Aristida gracilis, Ell.
574 Muhlenbergia Mexicana, Trin.
575 Muhlenbergia diffusa, Schreber.
576 Phleum pratense, L.
577 Sporobolus vaginæflorus, Vasey, var. tenuior, Vasey.

"Your Sporobolus vaginæflorus, Vasey, is Vasey's var. tenuior. The spikelets approach those of Sporobolus asper, and this, together with its nearly erect habit, runs it very close to that species." SCRIBNER.

Agrostis alba, L.
579 Agrostis alba, L., var. vulgaris, Thurb.
580 Agrostis perennans, Tuckerm.
581 Agrostis scabra, Willd.
582 Cinna arundinacea, L.
583 Danthonia spicata, Beauv.
584 Eleusine Indica, Gaertn.
585 Triodia cuprea, Jacq.
586 Eatonia Pennsylvanica, Gray.
587 Eragrostis reptans, Nees.
588 Eragrostis major, Host.
589 Eragrostis Frankii, Meyer.

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590 Eragrostis Purshii, Schrader.
591 Eragrostis pectinacea, Gray.
592 Dactylis glomerata, L.
593 Poa annua, L.
594 Poa compressa, L.
595 Poa pratensis, L.
596 Poa sylvestris, Gray.
597 Glyceria nervata, Trin.
598 Festuca elatior, L. var. pratensis, Gray.
599 Bromus secalinus, L.
600 Bromus ciliatus, L., var. purgans, Gray.
601 Lolium perenne, L.
602 Elymus Virginicus, L.
603 Elymus Canadensis, L.

"I had considered this the variety glaucifolius, but I am advised by Prof. Scribner that the foliage in that form is decidedly more glaucous than in the Cincinnati plant." LLOYD.

604 Elymus striatus, Willd.
605 Asprella Hystrix, Willd.
Equisetum arvense, L.
Equisetum hyemale, L.
608 Adiantum pedatum, L.
Pteris aquilina, L. (Crittenden.)
Asplenium ebeneum, Ait.
Asplenium augustifolium, Michx.
Asplenium thelypteroides, Michx.
Phegopteris haxagonoptera, Fee.
Aspidium acrostichoides, Swartz.
615 Cystopteris fragilis, Bernh.
Onoclea sensibilis, L.
617 Botrychium Virginianum, Swartz.

ADDITIONS.

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THE HERBARIUM OF C. G. LLOYD.

At the present writing (1891) our private collection consists of about 22,000 specimens, which are contained in 145 volumes, bound in the "Emerson binder," and presents the appearance of a library. Each volume is labeled on the back, and we can refer to any specimen in the entire collection as readily as to a word in the dictionary.

It would require more space than at our disposal, to give the details of the collection, or name the many botanists, both in this and foreign countries, who have favored us with exchanges.

The following is an approximate resume of the collection :

Plants of Gray's Manual	32	volumes,	4800	specimens.
" " Southern States	10	"	1500	"
" " Western States and Texas	22	"	3300	"
" " Germany	23	"	3400	"
" " Austria and Switzerland	16	"	2400	"
" " England	8	"	1200	"
" " France	10	"	1500	"
" " Norway and Sweden	5	"	750	"
" " Italy	2	"	300	"
" " Australia	6	"	900	"
" " New Zealand	4	"	600	"
Carices of Europe	4	"	600	"
Miscellaneous Countries	2	"	300	"
Cultivated Plants	1	"	150	"

We have on hand several thousand duplicates of Cincinnati plants, as indicated in this check list, and will be glad to exchange with any botanist, wherever located, who collects good specimens.

C. G. LLOYD,

Court and Plum Streets, Cincinnati, Ohio.

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resulting in the protrusion of the wall in an oblique direction; or the latter character may exist independently of the former. A peculiar instance is shown in fig. 9, *a* and *b*, where a sporidium seems to be almost fully developed laterally, then its wall is protruded from near its base into a new tube which again branches. It seems that a promycelium bears only one of these reproductive bodies, as more than that number have not been observed; still this cannot now be positively asserted. The true development of the promycelia is often interfered with on account of parasitic attacks. Owing to the large size of the spores of this fungus, they carry many adhering germs into the cultures, and the tender promycelial tubes are favorite spots for bacterial growth. It appears that the germination of a sporidium is by the prolongation of the pedicel-like end of attachment (fig. 5, *c*).

If the cells of a germinating teleutospore are separated by gentle pressure under a cover glass, the emergence of the promycelia from the germ pores can be noted. In the peripheral cells, which are externally somewhat convex, the germ pore is situated at the upper and inner extremity (fig. 10), while in the more angular central cells it may be at any distal corner (fig. 12, *a*). In all cases it is marked by the junction of the thick external cell wall with the thinner wall separating individual cells. The germ pore can be more distinctly seen by the usual examination with sulphuric acid.

In Ravenelia cassiæcola only has the germination of teleutospores thus far been observed, but these notes serve to indicate that the germination is generically characteristic. It differs from that of such typical genera as Puccinia, etc., in the non-septate character of the promycelia, except in such species as P. heterogena above mentioned, where the germination takes place in an abundance of water. "In *Coleosporium*," says Plowright,[6] "each cell produces a single promycelial spore," and from his illustration of *C. senecionis* we observe that the tube which bears this sporidium tapers gradually to a very small size. Now if we deem both promycelium and sterigma essential terms, it is difficult to differentiate their limits in such cases. Sorauer[7] only states that each cell develops a simple promycelium with a sporidium. De Bary[8] defines

[6] British Uredineæ and Ustilagineæ, p. 45.
[7] Pflanzenkrankheiten, 2te Aufl., II, p. 244.
[8] Morphology and Biology of the Fungi, etc., p. 281.

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the character of producing a single sporidium as peculiar to Coleosporium, but he names the entire tube from which this body is abscised a sterigma. Since the term sterigma is more or less broad, we may regard *Coleosporium* as possessing a truly non-septate promycelium, and still the above details will perhaps make clear the essential modifications in R. cassiæcola and probably the general features in the germination of the genus Ravenelia.

Polytechnic Institute, Auburn, Ala.

EXPLANATION OF PLATES IX AND X.

PLATE IX.—Fig. 1, germinating teleutospore, showing normal condition of promycelium. Fig. 2, same as above with a slight geniculation and rudimentary branching. Fig. 3, a promycelial branch almost at right angles to the former course. Fig. 4, *a* and *b*, stages in the development of sporidia; *a* also shows apparent septa. Fig. 5, *a* and *b*, sporidia; *c*, sporidium germinating. Fig. 6, *a* and *b*, abnormal conditions of promycelia. Fig. 7, *a* and *b*, same as fig. 6, but representing appearances on following day. Fig. 8, teleutospore with single promycelium and abscised sporidium germinating while still in the vicinity of its point of production.

PLATE X.—Fig. 9, *a* and *b*, peculiar development of a promycelium noted on successive days. Figs. 10, 11 and 12, representing cells separated by pressure, and showing the location of the germ pores and the emergence of the promycelia. Fig. 13, teleutospore germinating, but so surrounded by other spores that the promycelia are modified. Figs. 14 and 15, normal teleutospores of different number of cells. Figs. 16, *a*, *b* and *c*, individual cells, showing relative thickness of cell walls and the common external coat.

All figures were drawn under camera lucida.

Notes on Carex. XVI.

L. H. BAILEY.

An unusual amount of carex material has come into my hands within the last year, bringing a number of new species, extending the ranges of well known species to an important extent, and affording data for the clearing up of old doubts. These specimens have come from almost every part of North America and from very many collectors; in fact, the carex flora of the country has never had so many friends as at present. Some of the most important facts concerning the geographical distribution of species are recorded below.

Carex obesa All., var. *minor* Boott, heretofore not known south of Saskatchewan, was collected last July upon high bluffs at South Fowl Lake, Northern Minnesota, by F. F. Wood.

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C. Torreyi, the rarest of the eastern carices, was found in abundance upon a small area in 1890, in the suburbs of Minneapolis, by J. H. Sandberg. This species was reported from New York and Pennsylvania a half century ago, but has never been rediscovered within Gray's Manual region until the present finding. It occurs in Colorado and in British America, and its reference to New York and Pennsylvania is probably an error. The original specimens were found in a European herbarium mixed with *C. pallescens* from New York and Carlton House, British America.

C. Tuckermani, reported no farther east than western New England, has been found at Kineo, Moosehead Lake, Maine, by Dr. G G. Kennedy.

C. chordorhiza, not known east of Vermont heretofore, is sent from Orono, Maine, by M. L. Fernald.

C. laxiflora var. *divaricata* has been collected at Natural Bridge, Virginia, by J. R. Churchill.

C. hystricina var. *Dudleyi* was found growing quite abundantly in a low place at Owosso, Michigan, by G. H. Hicks. This is the fourth station for the plant.

C. cephaloidea, not known east of western Massachusetts, where Dewey first found it, is now found in York Co., New Brunswick, by Mr. Brittain.

C. trichocarpa var. *Deweyi*, is sent from Ames, Iowa, by Professor A. S. Hitchcock. It has been known in the Manual region only from Dakota.

C. distans Linn., a European species, was found in ballast in Philadelphia, in 1877 and 1884, by I. C. Martindale. Mr. Martindale also found at Atco, N. J., in 1876, the true *C. flava* var. *Œderi* Lilj. This is the only finding of this plant in America, so far as I know. *C. panicea* is sent from Sellersville, Penn., by C. D. Fretz. This species, while very thoroughly established in some parts of Massachusetts, does not appear to extend itself rapidly into new regions.

Since the separation and proper delineation of *C. deflexa* and *C. Novæ-Angliæ*, these species have been sought and they are found to be more frequent than the Manual record indicates. *C. deflexa* is not confined to "high mountains," having even been found in a low sandy pasture on the banks of Great Works River, S. Maine, by John C. Parlin. It is also sent from the Keweenaw peninsula, Northern Michigan, by O. A. Farwell. *C. Novæ-Angliæ* is frequent at Mt. Desert, and

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Edwin Faxon sends a fine suite of specimens from the White Mountains: from Profile Lake and Bald Mt., Franconia Notch; White Mt. Notch near Willey House; woodland cleared of trees, between Fabyan's and base of Mt. Washington; summit of Mt. Willard. It is strange that this well marked species should have been so long overlooked.

Three species are added to the Manual region from Nebraska: *C. Nebraskensis* Dewey, from Anselmo, Custer Co., and Hot Creek Basin, Sioux Co., by H. J. Webber. This is the first time the species has been found within the present limits of Nebraska. *C. Douglasii* Boott, Anselmo, Custer Co., Webber. *C. marcida* Boott, Anselmo and Broken Bow, Custer Co., and Thedford, Thomas Co., Webber; Alliance, Box Butte Co., G. D. Swezey.

C. canescens var. *dubia* Bailey, which has been one of the most obscure forms of a perplexing species and which has been known only from one collection in the Uintah Mountains and another in the Wahsatch, is now represented in my herbarium by good specimens from the Blue Mts. of Eastern Oregon (Cusick), Skamania Co., Washington (Suksdorf), and Tulare Co., Cal. (Coville, 1506 Death Valley Expedition). It proves to be well defined.

Among the novelties, the following appear to be supported by sufficient evidence:

C. herbariorum n. sp.—One of the FERRUGINEÆ allied to *C. ablata* and *C. luzulæfolia*: tall and slender (2 ft. or more?), smooth throughout; leaves broad ($\frac{1}{4}$ or $\frac{3}{8}$ in.), thick and stiff and apparently half evergreen, long; staminate spike single, an inch or two long, on a stalk of about its own length, rusty, the scales nearly linear and pointed; pistillate spikes 3 or 4, approximated near the top of the culm, erect, an inch or so long, evenly cylindrical, rather loosely flowered, rusty, on stalks once or twice their own length and springing from loose sheaths about an inch long which are tipped with an awn-like projection of similar length; perigynium medium or below in size, lanceolate, prominently excurved at maturity, strongly nerved and 2-toothed, smooth, about the length of the ovate and pointed brown-margined scale.—A well marked species with perigynia reminding one of the interesting VIGNEASTRÆ section. Habitat unknown. The species was found in a miscellaneous batch of nondescript carices from Herb. Olney (Brown University), without date, locality or

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collector. Since the determination of the species, James L. Bennett, of Brown University, writes that the plant was collected by Wheeler's Expedition West of the 100th Meridian. In Wm. Boott's report upon the carices of this expedition there is nothing to suggest this species.

C. Pringlei n. sp.—One of the PALUDOSÆ, not closely allied to any American species, but coming nearest, perhaps, to *C. riparia:* tall, stiff and stout (four to six feet high), pale throughout, the culm obtusely angled and smooth; leaves stiff and long, rough on the edges and sometimes on the keel; staminate spikes three or four, an inch or two long or the terminal one twice longer, cylindrical, scarcely stalked, the bases enveloped by a scarious bract, the scales of the spikes linear and membranaceous with a somewhat expanded tip which is more or less jagged and provided with a short cusp; pistillate spikes three to six, all approximated or aggregated, heavy and densely flowered, two to four inches long, sessile and erect, their bases subtended by an expanded and long-pointed bract; perigynium long-linear-elliptic or linear-ovate (about four lines long), thin and flat, the small and stipitate three-angled achenium lying nearly in the center, faintly few nerved, beakless, the orifice entire or slightly sulcate, the lower portion smooth, but the upper part sparsely hairy, about the length of or slightly shorter than the strong-pointed or even awned rough scale.—A coarse bushy-spiked species with something the look of *C. spissa;* collected August 4, 1891, on borders of pools and streams in alkaline meadows one hundred miles east of the city of San Luis Potosi (Hacienda de Angustura), Mexico, by C. G. Pringle (No. 3801).

C. xerantica n. sp.—Group OVALES, between *C. pratensis* and *C. fœnea*: differs from the above species in its short erect silvery-white head, and broader, much firmer and nerveless perigynium. It is a tall and very stiff species with a straminea-like aspect, and dry appearance. It was collected at File Hills, British America (104° longitude, and 50½° latitude), by John Macoun, July 4, 1879, and at Moose Jaw, about thirty miles west and forty south of File Hills, by the same collector July 18, 1880, in both of which stations it was rather abundant. I have endeavored for a number of years to refer this perplexing plant to some of its neighboring species, but the attempt is always unsatisfactory. Its characters are constant in a good suite of specimens, and it appears to merit specific distinction.

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C. Montanensis n. sp.—Belongs to the RIGIDÆ and is allied to *C. Tolmiei*, although it has much the habit of the PENDULINÆ (as *C. Magellanica*): a foot or a foot and a half high, in tough clumps, the culms weak at the top and mostly nodding, somewhat overtoping the flat and rather soft narrow ($1\frac{1}{2}$ to 3 lines wide) leaves; staminate spike single, about a half inch or less long, ovate or ovate elliptic, brown-purple, on a short and weak stalk, the scales thin and mostly blunt; pistillate spikes three to five, borne at the top of the culm and drooping or nodding on slender stalks, from one-half to three-fourths of an inch long, dark colored, the lowest bract leafy and about equalling the culm; perigynium ovate, soft, nerveless (entirely lacking in the granulated character of *C. Magellanica* and its allies), terminated by a short and very slightly toothed beak about the length of but broader than the black-purple blunt scale; stigmas two or three.—Montana, Upper Marais Pass, W. M. Canby, Aug. 2, 1883 (no. 350), and along subalpine streams, Park County, Frank Tweedy, Aug. 5, 1887. Also on mountain slopes, Kootanie Pass, Rocky Mountains of British America, John Macoun, Aug. 9, 1883. I have at different times referred this plant to *C. atrata* var. *ovata* and *C. Tolmiei*.

C. bella n. sp. (*C. atrata* var. *discolor* Bailey).—This beautiful plant appears to have no immediate connection with *C. atrata*, and when I first referred it to a variety of that species I thought that "it is not improbable that it is specifically distinct from *C. atrata*" (Journ. Bot., Nov. 1888). It is more closely allied to *C. Mertensii*. It is a slender plant, about two feet high, the culms surpassing the flat and long pointed leaves; spikes 3 or 4, the terminal one prominently staminate below and the others usually bearing more or less staminate flowers at the base, all approximated, the lowest one or two drooping on very slender peduncles and the upper ones sessile or nearly so, all narrowly cylindrical (about 1 in. long), compactly flowered, the whitish perigynia contrasting forcibly with the purple scales; perigynium ovate, whitish, thin and somewhat inflated, nerveless, abruptly contracted into a very small straight beak which is very lightly toothed or simply erose, much broader and mostly a little longer than the purple sharp pointed scale.—Mountains, Colorado, Utah, and Arizona.

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C. varia Muhl. var. **australis** n. var.—Stoloniferous; spikes all distinct or at least not aggregated, the lowest one often entirely separated from the rest, all usually longer than in the species itself; staminate spike straight and conspicuous. Tupelo and Starkville, Mississippi, Tracy; Houston, Texas, Nealley; and Hockley, Harris Co., Texas, Thurow.

C. aquatilis × stricta. A pronounced hybrid between these species has been found in some quantity at Orono, Maine, by M. L. Fernald. The hybrid is fully as vigorous as *C. aquatilis*, and is glaucous, but the perigynia and scales are stricta-like, although the spikes are large and thick, as in *C. aquatilis*.

Material wanted.—A carex which is said to produce good pasturage is reported to grow in Louisiana, but I have not been able to secure good specimens of it. I have obtained a bunch of the dry leaves and some loose perigynia from a correspondent in Grant Parish, central Louisiana, and I am not able to place the specimens with any species. It appears to be undescribed. My correspondent writes me as follows: "The plant grows here in the forest upon alluvial lands upon certain portions of the Red River bottoms. Near me are 500 or 600 acres covered with it upon which numbers of cattle and horses winter. It grows as thick as any grass, and not in bunches here and there, making a perfectly green and firm covering four to eight inches high." Unfortunately, my correspondent is not a botanist, and an expert witness is wanted to determine if all this pasturage is really a carex; and I desire good specimens of the plant for determination.

Our common *Carex echinata*, with its varieties, is in need of revision, and I shall be glad of any specimens which will throw light upon its variations.

Cornell University, Ithaca, N. Y.

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An automatic device for rolling culture tubes of nutrient agar agar.

GEO. F. ATKINSON.

(WITH PLATE XI.)

Rolled culture tubes of nutrient agar agar are so convenient for the separation of many micro-organisms, and are employed by so many investigators for the study of the growth and conformation of colonies that any device for rolling them successfully is worthy of note. Especially is this the case when such device is, under certain circumstances at least, an improvement over the present methods in use.

The device introduced by Esmarch of spinning the tubes on the surface of ice water while a rubber cap covered the cotton plug was improved upon by Dr. Booker, of Johns Hopkins University by spinning them in a groove upon a block of ice.[1] This is an exceedingly satisfactory method. There is one difficulty encountered, however, which in many cases varies from a trifling to a very serious matter, according as ice is obtained with comparative ease or great difficulty. Those who are fortunate enough to be located in centers where trade demands for ice provide a constant supply, encounter simply a trifling expense and the little attention necessary to obtain the supply needed. Many institutions and workers, however, are so situated that it is almost impossible during the winter months to obtain ice without going to great expense, and many times during any season of the year the trouble alone of providing it is no small annoyance.

Being so situated myself I have given my attention to devising some means of rolling the tubes with precision by making use of the water supply commonly provided for in laboratory fittings. It is possible with a stream of cold water from a faucet to so hold with the hands and revolve a tube as to distribute and fix the nutrient agar in a thin and tolerably even film. But many failures result and at best the tube is far inferior to one rolled on ice.

Recently I have made an automatic device for rolling the tubes under a continuous shower of cold water as perfectly and regularly as it is possible to do on ice and with far less trouble even though a constant supply of ice is within easy reach.

[1] Mead Bolton: Schizomycetes, etc. Reference Handbook of Medical Sciences, vol. VI.

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[Reprinted from the BULLETIN OF THE TORREY BOTANICAL CLUB, Vol. XX., No. 11, Nov. 15, 1893.]

Notes on Carex.—XVII.

BY L. H. BAILEY.

The most important recent extensions of the ranges of the carices are the finding of *Carex Assiniboinensis*, W. Boott, in Northern Minnesota, by F. F. Wood, and *C. alpina*, at Grand Marais, Minn., on Lake Superior; *C. torta*, in Washington county, Eastern Missouri, by H. Eggert; *C. capillaris*, on Mt. Kineo, Moosehead Lake, Maine, by Dr. G. G. Kennedy, and in Aroostook county, by M. L. Fernald. *Carex Assiniboinensis* is new to the United States, having been known heretofore only from the collections of Macoun in British America.

CAREX VERNACULA.

C. fœtida, American authors, not Allioni.

Distinguished from *C. fœtida*, its European congener, by stiffer and shorter leaves, shorter spikes, which give the head a more regular and compact look, and especially by much larger and broader and more or less prominently nerved perigynia.

This species, which is yet imperfectly known, inhabits the mountains from Colorado and Wyoming westward.

CAREX FETA.

C. straminea, var. *mixta*, Bailey, Proc. Amer. Acad. Arts and Sci. xxii. 151 (1886), not *C. mixta*, Raeusch.

The Pacific coast representative of *C. albolutescens* (*C. straminea*, var. *fœnea*), from which it differs in its much slenderer habit, more open and long heads, smaller spikes and perigynia. The perigynia are loosely placed in the spike, giving the plant much the

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appearance of forms of *C. straminea* and *C. fœnea.* In the Botany of California it is variously referred to *C. lagopodioides*, *C. adusta*, *C. cristata*, var. *mirabilis*, and *C. scoparia*, var. *fulva.*

Carex lurida, var. PARVULA (Paine).

C. tentaculata, var. *parvula*, Paine, Cat. Oneida Pl. 105 (1865).

Low (8′ to 16′), very slender, with one or two spikes which are half or less the size of those in the type, sessile or very nearly so; perigynia not more than half the size of those in the common form. A diminutive form growing along the Mohawk River, according to Paine; I have also collected it in Southern Vermont, and Professor Hitchcock sends it from Ames, Iowa.

Carex intumescens, Rudge, var. FERNALDII.

Very slender (about a foot and a half high), with leaves narrower than in the type; spikes reduced to one to three perigynia, which are erect and slender, being inflated less than half as much as those in the type.—Cedar Swamp, Aroostook county, Maine, 1893. M. L. Fernald, 127.

Forms of *C. intumescens* sometimes occur in dry woods, in which the spikes are reduced to one or two perigynia; but this variety differs in the slender perigynia which stand erect in the spike.

Carex debilis, Michx., var. INTERJECTA.

C. debilis Sartw. Exsicc. No. 118 (1848).

C. debilis β Boott, Ill. t. 273 (1860).

Tall and nearly or quite strict, with nearly erect spikes which are often compound at the base, very loosely flowered; perigynium shorter than in the var. *Rudgei*, the beak conspicuously less cylindrical. It differs from the var. *strictior* in the much narrower leaves and more loosely flowered spikes. Sartwell collected it at Penn Yan, N. Y., and Boott reports it from Pennsylvania by Townsend. Mr. C. L. Shear sends me specimens from Alcove, eastern New York, which is the first undoubted material I have obtained to match Boott's excellent plate and Sartwell's specimens. I do not know what its range may be. Undoubtedly various intermediate erect-spiked forms, which have always been a puzzling part of *Carex debilis* will need to be referred here. The erect alternate-flowered spikes and short perigynia distinguish it from the common var. *Rudgei.*

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Carex granularis, Muhl., var. RECTA, Dewey, Wood's Cl. Book, 1860, 763.

A very tall slender plant, with narrow erect leaves, narrow spikes, of which the lower are on very long and slender stalks; pergynium less inflated than in the type and straighter. Glaucous. Dewey records it from Southern Illinois (Vasey) and Louisiana. (Hale). I have it from Virginia, Southern Illinois, the mountains of Georgia, and Mississippi. It is a well-marked form. No one seems to have taken up the variety except Paine, in his Catalogue of Oneida plants (1865); but Paine must have misunderstood it, for I do not know that it occurs in the North.

CAREX GRACILLIMA × ÆSTIVALIS?

Mr. C. L. Shear sends me from eastern New York, good specimens of a most distinct and novel carex. He first found the plant last year (1892), in a moist meadow at Alcove, Albany county. A single clump only was observed, and it grew with *C. gracillima.* In 1893 Mr. Shear found it again at two places in Greene county—between Windham and Ashland, and at Hunter —growing in clumps in mountain pastures. The plant differs visibly from *C. gracillima* in its much stricter habit, narrow leaves, nearly erect spikes, and by the distinctly beaked and toothed perigynium. Its association with *C. gracillima*, and the fact that it is uniformly wanting in good achenia, indicate that the plant is a hybrid. I am unable to determine what its other parent may be, but the fact that the perigynia are attenuated at the top, that the leaves are narrowed, the lower sheaths slightly pubescent, and the habit essentially erect, strongly suggest *C. æstivalis*, and this species occurs on the mountains of western Massachusetts and in eastern New York. I suspect that further search will discover *C. æstivalis* in the mountain pastures of Albany and Greene counties. It is by no means necessary to the diagnosis of a hybrid that both parents be found in its vicinity. One parent, or even both of them, may long since have died out and the hybrid may have persisted; yet the hybrid is usually associated with its pistillate parent. I have found undoubted hybrids of Rubus in localities where but one parent could be formed. Nor is it strange that a hybrid should be found to have a somewhat wide distribution. *Carex arctata* × *castanea* (*C. Knieskernii*) occurs in New

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York, Minnesota and upon the Canadian side of Lake Superior; and I may add that *C. gracillima* × *hirsuta* was found at an early day, according to Dewey (Sill. Journ. xi. 315), at Newburgh, New York, and at Stockbridge, Mass., although it has been recorded by Torrey and subsequent writers as having been collected only at Phillipstown, near the Hudson. It is strange, however, if *C. æstivalis* is the missing parent of this beautiful carex, that the beak should be bifid, for both *C. gracillima* and *C. æstivalis* have entire orifices.

This is the third hybrid which seems to have had *Carex gracillima* for its mother. It is interesting to note, also, that this species often develops its perigynia apparently without the aid of pollination.

CAREX ÆSTIVALIS, while one of our rarer Carices, has received a variety of names. Its first name was *Carex Darlingtonii* given by Schweinitz, but the name was not published until Dr. Boott recorded it, as a synonym, in 1858. The original of this is now in the possession of the Philadelphia Academy of Sciences, and the ticket, in Schweinitz's hand, says that Darlington collected the plant upon the Pocono Mountains of northern Pennsylvania. M. A. Curtis also gave it the name *Carex tabularia* in his herbarium, and this name was also published as a synonym by Boott. A specimen bearing this name, and coming from Boott, is in the Torrey Herbarium. Kunze called the plant *Carex Rugeliana* in his "Supplemente zu Schkuhr's Riedgräsern," which was published at intervals from 1840 to 1850. I am not sure of the date of this name, but it is held to be later than Curtis' *Carex æstivalis*, which Dr. Gray published in 1842. Finally, Olney, in his Exsiccatæ, 1871, made it a variety of *Carex virescens*, with which it has no immediate affinity. The affinity of the plant is with *Carex gracillima*, of which John Carey thought, "if not distinct, it is a mountain form." Dewey confounded it with *Carex arctata* and *Carex sylvatica*. But it is abundantly distinct. Its northernmost station is Saddle Mountain, in western Massachusetts, where Dewey found it in 1828, at 800 feet above the base of the mountain.

THE STRAMINEA GROUP:

Willdenow described, in 1809, the plant which has long been known as *Carex adusta*, under the name of *C. fœnea*. The description was not understood, however, and Torrey, in 1836, applied

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Willdenow's name to the plant which is now known as *C. straminea*, var. *fœnea*. These two *fœneas* now stand, applied to plants very like each other, and the circumstance is confusing. I shall, therefore, find some other name for the *C. straminea* var. *fœnea* of Torrey, especially as I believe the plant merits specific distinction. It was first described by Schweinitz in 1824, as *Carex albolutescens*, and this name I now restore. Unfortunately, Olney misunderstood Schweinitz's plant and thought it to be the *C. adusta* of our manuals. I have seen Schweinitz's original, and it is clearly Torrey's *fœnea*. There are forms which are somewhat intermediate between *Carex straminea* and *C. albolutescens*, but one who is familiar with the two species can easily place them. But I separate them in order to allow of a philosophical presentation of *C. straminea* and its varieties. This species, as heretofore constituted, includes two coördinate branches or type, the stramineous or straw-colored and the albolutescent or silvery green type. If these types are considered to be coördinate varieties, it is impossible to recognize several minor forms, which appear to be worthy varietial recognition, unless resort is taken to the European fashion of sub-varieties. By removing the albolutescent type, I am able to separate some of the well-marked forms which now confuse *C. straminea* var. *brevior* into coördinate varieties. The forms which I desire to remove from it are:

Carex straminea, var. FERRUGINEA (Gray).
C. fœnea, var. β Boott. Ill. 118, t. 376 (1862).
C. fœnea, var.? *ferruginea*, Gray Man. 5th ed. 580 (1867).
C. tenera, var. *suberecta*, Olney, Exsicc. fasc. ii. No. 16 (1871).

Plant very tall and slender, with two or three pointed or long-ovate, rusty-green spikes approximate at the top. The spikes are usually prominently tapering below, and the thin, nearly nerveless perigynia have loose points. That has somewhat the look of some forms of *C. scoparia*, but is always readily distinguished by its separated spikes and *straminea*-like perigynia. I know it only from Ohio and Illinois, but it must have a wider range.

C. straminea, var. CRAWEI, Boott, Ill. 121, t. 388 (1862).
C. straminea, var. *Meadii*, Boott, l. c. t. 389.

Robust forms with very large heads and mostly round, loose

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spikes, with very broad, long-pointed perigynia, which easily shell off when ripe. From Connecticut and New Jersey to Illinois; evidently more common westward.

CAREX ALBOLUTESCENS, Schw. Ann. N. Y. Lyc. i. 66 (1824).

C. straminea, var. *fœnea*, Torr. Monogr. 395 (1836), not *C. fœnea*, Willd. (1809).

C. straminea, var. β Gay, Ann. Sci. Nat. 2d ser. x. 362 (1838).

C. leporina, var. *bracteata*, Liebm. Mex. Halv. 264 (1850).

C. straminea, var. *chlorostachys*, Bœckl. Linnæa, xxxix. 118 (1875).

Var. CUMULATA (Bailey).

C. alata, var. *pulchra*, Olney (mostly), Exsicc. fasc. ii. No. 23 (1871).

C. straminea, var. *cumulata*, Bailey, Mem. Torr. Bot. Club, i. 23 (1889).

CAREX ECHINATA, AND ITS AMERICAN CONGENERS:

The American plants which have been variously known as *Carex echinata*, *Carex stellulata*, *Carex sterilis* and *Carex scirpoides* have been the subject of more neglect than any other American carex, perhaps more, even, than any other of the older species of our flowering plants. This lack of attention is due both to the polymorphous character of the species and to the uncertainty of a specific identification with the European plant. Every collector must have noticed that all printed descriptions of the species are singularly unsatisfactory, and that widely different forms are thrown loosely under one name. The species is not an attractive one at best. I have long felt that the plant has never been understood, and for two or three years I have made a special effort to collect material for study. The arrangement of this material, which I now propose, seems to solve the difficulties which have always attached to the species. The solution of the perplexities turns upon two questions:

1. Is the American plant identical with the European? Over thirty years ago Francis Boott questioned if the American plant is the same as the European *C. stellulata* (or *C. echinata*), but no monographer since Muhlenberg seems to have eliminated the European species from our flora. The plants of the two continents are exceedingly similar, and yet there is a facial difference

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between them which is nearly always apparent and often striking. Definite specific characters of separation are obscure, and yet I am convinced that they exist. The American plant is habitually taller than the European, the scales are sharper and usually longer, the perigynia are more strongly nerved and more attenuated or conical, and, above all, it is far more variable. The history of American *Carex* literature is a continuous record of the separation of American and European types. There are probably no species common to both countries, except those which are hyperboreal and occur through the Arctic regions of both hemispheres, being found in Greenland. There are other supposed identical species, aside from *Carex echinata*, which, I think, will eventually be separated in the two continents. I am satisfied that the American species under consideration can never be properly understood until it is treated independently of the European plant.

2. Is the American species monotypic? Any acute observer would at once see that our so-called *Carex echinata* contains two distinct general types, if the specimens were spread before him; and, fortunately, these facial attributes are reinforced by excellent specific characters. One type, to which the *Carex sterilis* of Willdenow and the *C. scirpoides* of Schkuhr belong, is characterized by distinctly long-beaked spreading or ascending winged perigynia, and loose, bushy yellowish spikes; the other, which has no name, is marked by very short-beaked, small and nearly wingless perigynia, which are spongy and more or less cordate at the base and which shell off upon the sheet, and by more rounded or cylindrical greenish spikes—the terminal one often oblique—in which the perigynia are strongly divaricate or often bent downwards. And aside from these, the stiff and wide-fruited sea-board plant—known as var. *conferta*—will be seen to have ample specific characters. I have, therefore, outlined three species from the material heretofore thrown loosely into *Carex echinata*. This, I hope, will be better than detailing a mere list of varieties which should have no coherence, and which should differ from each other in the very terms by which the species is distinguished from its fellows. These plants may be outlined as follows:

CAREX STERILIS, Willd. Sp. Pl. iv. 208 (1805). Sartwell Exsicc. No. 37. Boott. Ill. t. 146.

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C. scirpoides, Schkuhr, Riedgr. Nachtr. 19, fig. 180 (1806).

C. stellulata, vars. *scirpoides* and *sterilis*, Carey, Gray's Man. 1848, 544.

C. echinata, var. *microstachys*, Boeckl. Linnæa, xxxix. 125 (1875).

C. echinata, var. *microstachya*, Boeckl. Flora, 1875, 563.

C. echinata, var. *microcarpa*, Bailey, Coulter's Rocky Mt. Bot. 395 (1885).

Short, stiff and erect (usually not much exceeding a foot in height), the old leaves often persistent; head tawny or greenish-yellow, short, composed of from three to five small loosish contiguous spikes, of which the uppermost is usually conspicuously attenuated at the base by the presence of staminate flowers; sometimes the terminal spike or even the whole head is entirely staminate; perigynium thin and flat, conspicuously contracted into a slender beak which is nearly or quite as long as the body and spreading so as to give the spike an echinate appearance, sharp-edged and rough on the upper margins, variously nerved and very sharply toothed.—A common plant, growing in dryish bogs and swales throughout the Northern States east of the Mississippi; and I also have it from Willow Springs, Arizona (*Palmer*, 548), and Mt. Adams, Oregon (*Henderson*). The plants of Willdenow and Schkuhr seem to have been variously understood by successive botanists, although the figures of both *C. sterilis* (fig. 146) and *C. scirpoides* (fig. 180) in Schkuhr's "Riedgräser" are unequivocal. I have also seen the originals of both plants. The dioeciousness of the species seem to be only an occasional state, and as I have not been able to discover other characters which uniformly accompany it, I have thrown *C. sterilis* and *C. scirpoides* together.

Var. EXCELSIOR.

C. stellulata and *C. echinata*, American authors. Sartwell, Exsicc. no. 35.

C. sterilis β Boott, Ill. 56, t. 146* (1858).

Taller and more slender (often two feet high), the heads usually more scattered and mostly somewhat greener.—Common in wet bogs and woods, apparently in all the Northern States; occurs also in Louisiana, Mexico, and in Oregon and Vancouver Island.

Var. CEPHALANTHA (Bailey).

C. echinata, var. *cephalantha*, Bailey, Mem. Torr. Bot. Club, i. 58 (1889).

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Rather stiff but slender and tall, or the top of the culm weak (1–2 feet high); head mostly continuous or more or less dense and composed of five to eight approximate (rarely scattered), large (15–30 flowered) green or greenish loose spikes, in which the mature narrow, long-beaked perigynia usually spread at nearly or quite right angles.—Runs across the country from the northern borders of the United States northward, from the Atlantic to the Pacific, reaching as far south as the higher elevations in northeastern Pennsylvania. There are two forms in this, one (the type) marked by aggregated spikes, and one by more or less scattered spikes. The latter may be worth varietal recognition.

Var. ANGUSTATA (Carey).

C. stellulata, var. *angustata*, Carey, Gray's Man. 1848, 544.

C. echinata, var. *angustata*, Bailey, Mem. Torr. Bot. Club, i. 59 (1889).

Very slender, sometimes almost thread-like, weak, bearing long and narrow divaricate perigynia, which are either in loose small heads or in scattered spikes.—New England to Newfoundland. Apparently also in Montana.

CAREX ATLANTICA.

C. stellulata, var. *conferta*, Chapm. Fl. S. States, 534 (1860), not *C. conferta*, Koch.

C. echinata, var. *conferta*, Bailey, Carex Cat. (1884).

Tall (16 to 24 inches) and very stiff and strong, the leaves broad but stiff and usually becoming somewhat involute when dry; spikes contiguous or scattered, spreading, globular or short-cylindrical, densely flowered, green; the terminal one slenderly contracted below or even entirely staminate; perigynium large and very broad (the body about as broad as long), with a distinct rough, bifid beak, strongly many-nerved, especially upon the back, squarrose or usually retrorse at maturity, shelling off readily when ripe.—Follows the coast from Newfoundland to Florida; not common. It is strange that none of the earlier students of the genus discovered this distinct plant.

CAREX INTERIOR.

C. scirpoides, Sartwell, Exsicc. No. 36 (1848). *C. stellulata*, var. *scirpoides*, Boott, Ill. t. 146** (1858).

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Very slender, but mostly strict (1–2 feet high), the thin wire-like culms usually longer than the narrow and rather soft grass-like leaves; head composed of two to four little globular contiguous greenish-tawny spikes, of which the terminal one is usually slenderly contracted or stipe-like below and often oblique; perigynium very small and plump, the margins very narrow or almost none, lightly many nerved on the back, but usually nerveless or nearly so on the face, prominently corky at the base, the beak and the teeth very short, spreading or reflexed at maturity and easily shelling off.—Bogs and swamps, in the interior country, from Maine to Minnesota and Kansas. When this plant is once understood, I am sure that its identity cannot be mistaken. The utter confusion in which our *Carex echinata* has always lain, must be the only reason why the plant was not separated long ago. Boott knew that it is distinct from *C. sterilis*, but he made the mistake of trying to identify it with Schkuhr's *C. scirpoides*. But Schkuhr's plant, as his plate plainly shows, was a short, stiff, fulvous plant with oblong spikes and long-beaked broad-winged perigynia.

VAR. CAPILLACEA.

Still more slender or even bristle-like in both culm and leaves, and habitually lower (sometimes 16 inches, but often only half as high); perigynium more cordate at the base and broader, strongly many-nerved upon both sides.—Eastern Massachusetts, New Jersey and Central Pennsylvania. Perhaps specifically distinct from the last. My attention was first called to this plant some years ago by the late William Boott, who was once inclined, I think, to publish it.

HOMONYMOUS NAMES.

The Committee on Nomenclature of the Botanical Club adopted, at Rochester, an article which declares that "the publication of a generic name or a binomial invalidates the use of the same name for any subsequently published genus or species, respectively." This rule, I am instructed, is to be enforced rigidly in the forthcoming Check List to be issued officially by the Club. The committee has also decided, by a recent vote upon *Carex Michauxiana* and *C. Michauxii* as a test case, that proper names

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differing only in their terminations are homonymous. It is with much regret and hesitation that I apply this rule to the carices of the Check List, although I fully sympathize with it. While the necessary changes are not numerous, they involve some of our best known species. The innovations which follow as a direct or indirect result of the homonymy of the Check List are as follows:

CAREX ABACTA.

C. rostrata, Michx. Fl. Bor. Am. ii. 173 (1803), not Stokes in With. Arrang. Brit. Pl. 2d ed. 1059 (1787).

C. xanthophysa, vars. *nana* and *minor*, Dewey, Sill. Journ. xiii. 353, figs. 57, 58 (1828), not *C. nana* Lam., nor Cham. nor Boott; *minor* has been frequently used in the genus.

C. Michauxiana, Bœckl. Linnæa, xli. 336 (1877), not *C. Michauxii*, Schw. (1824), nor Dewey (1826).

CAREX ABBREVIATA, Schw. in herb.; Boott. Linn. Trans. xx. 141 (1846); Ill. 21 (1858). *C. Torreyi*, Tuckm. Enum. Meth. 21 (1843), not *C. Torreyana*, Schw. (1824), nor Dewey (1826).

Boott originally attributed the herbarium name *abbreviata* to Prescott, but it was really Schweinitz's, and the error is corrected in Boott's Illustrations, i. p. 21.

CAREX ASA-GRAYI.

C. intumescens, var. *globularis*, Gray, Ann. N. Y. Lyc. iii. 236 (1834), not *C. globularis*, Linn.

C. Grayii, Carey, Sill. Journ. 2d ser. iv. 22 (1847), not *C. Grayana*, Dewey (1834).

Var. HISPIDULA (Gray).

C. Grayii, var. *hispidula*, Gray in herb.; Bailey, Mem. Torr. Bot. Club, i. 54 (1889).

CAREX AUSTRO-CAROLINIANA.

C. Caroliniana, Buckley, Sill. Journ. xlv. 173 (1843), not. Schw. (1824).

Table Mountain, South Carolina.

CAREX COLLINSII, Nutt. Gen. N. Am. Pl. ii. 205 (1818).

C. subulata, Michx. Fl. Bor.-Am. ii. 173 (1803), not Gmelin, Syst. ii. part i. 138 (1791), nor Schumch. Faell. i. 270 (1801), nor Wahl.

C. Michauxii, Dewey, Sill. Journ. x. 273 (1826).

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CAREX DURIFOLIA.

C. Backii, Boott; Hook. Fl. Bor.-Am. ii. 210, t. 209 (1840), not *C. Backana*, Dewey (1836).

CAREX FRANKII, Kunth, Enum, Pl. ii. 498 (1837).

C. atherodes, Frank, Hb. Unio. Itin. (1835), not Sprengel (1826).

C. stenolepis, Torr. Monogr. 420 (1836), not Lessing, Reise durch Norwegen (1831).

So long ago as 1843 Kunze observed that Torrey's *C. stenolepis* is antedated by Lessing's, and Gray called attention to the fact in Silliman's Journal in 1844.

CAREX LOUISIANICA.

C. Halei, Carey, Chapm. Fl. S. States, 543 (1860), not Dewey (1846).

Florida to Louisiana and Texas and Arkansas.

CAREX MEMBRANOPACTA.

Carex compacta, R. Br. Ross's Voy. Append. cxliii. (1819), not Krock. Fl. Sil. iii. (1814).

Carex membranacea, Hook, Parry's 2nd. Voy. Append. 406 not Hoppe, Ic. 71.

Carex saxatilis, var. *compacta*, Dewey, Sill. Journ. xi. 321 (1826).

Arctic America.

CAREX QUALICUMENSIS.

C. Macounii, A. Bennett; Macoun, Cat. Can. Pl. iv. 147 (1888), not Dewey (1866).

C. salina, var? *robusta*, Bailey, Bot. Gaz. xiii. 87 (1888), not *C. robusta*, Hochst.

Grows in large patches between tides in the bed of Qualicum River, Vancouver Island.

CAREX WALTERIANA.

C. striata, Michx. Fl. Bor. Am. ii. 174 (1803), not Gilib. Exerc. Phyt. ii. 550 (1792); Boott, Ill. t. 151 (1858).

Carolina to Florida. Now renamed in memory of Thomas Walter, author of Flora Caroliniana, 1788.

VAR. BREVIS (Bailey).

C. striata, β Boott, Ill. 57 (1858).

C. striata, var. *brevis*, Mem. Torr. Bot. Club, i. 34 (1889).

New Jersey to North Carolina.

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U. S. DEPARTMENT OF AGRICULTURE.
DIVISION OF BOTANY.

CONTRIBUTIONS

FROM

THE U. S. NATIONAL HERBARIUM.

Vol. IV.

ISSUED NOVEMBER 29, 1893.

BOTANY OF THE DEATH VALLEY EXPEDITION.

A REPORT ON THE BOTANY OF THE EXPEDITION SENT OUT IN 1891 BY THE U. S. DEPARTMENT OF AGRICULTURE TO MAKE A BIOLOGICAL SURVEY OF THE REGION OF DEATH VALLEY, CALIFORNIA.

BY

FREDERICK VERNON COVILLE,
Botanist of the Death Valley Expedition.

PUBLISHED BY AUTHORITY OF THE SECRETARY OF AGRICULTURE.

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NOTE.

The following publications relating to the botany of the Death Valley Expedition have already been issued:

Descriptions of new plants from southern California, Nevada, Utah, and Arizona. By Frederick Vernon Coville. <Proceedings of the Biological Society of Washington, Vol. VII, pp. 65–80, May 18, 1892.

The Panamint Indians of California. By Frederick Vernon Coville. <The American Anthropologist, Vol. V, pp. 351–361, October, 1892.

Sketch of the flora of Death Valley, California. By Frederick Vernon Coville. <Science, Vol. XX, pp. 342, 343, December 16, 1892.

Notes on the distribution of trees and shrubs in the deserts and desert ranges of southern California, southern Nevada, northwestern Arizona, and southwestern Utah. By C. Hart Merriam. <North American Fauna, No. 7. pp. 285–343, May 31, 1893.

Notes on the geographic and vertical distribution of Cactuses, Yuccas, and Agave, in the deserts and desert ranges of southern California, southern Nevada, northwestern Arizona, and southwestern Utah. By C. Hart Merriam. <North American Fauna, No. 7, pp. 345–359, with Plates VII to XIX, May 31, 1893.

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different from the eastern typical form of *S. americanus*, is clearly derived from that species. Small, starved specimens of the latter from western Texas, New Mexico, Arizona, and southern Utah have a close general resemblance to *S. nevadensis*, even to the rounded leaf-backs and slightly serrate leaf-tips.

The species was found only on the shores of Owens Lake, near Keeler (No. 857), and between Lone Pine and Olancha.

Scirpus olneyi Gray, Man. 526 (1848). Type locality, "salt marshes, Martha's Vineyard, Rhode Island, and New Jersey."

Although herbarium specimens of this species and *S. americanus* from the eastern United States are easily distinguished, I have experienced difficulty in separating the two as they occur in the Southwest. The extreme forms there are, however, clearly distinguishable, especially in the field. *S. americanus* grows about 0.6 meter high, in firm, usually gravelly soil on the margins of streams and ponds, while its rootstocks are slender, seldom exceeding 3 mm. in diameter, and bearing scattered stems. *S. olneyi*, on the other hand, grows often 1.5 meters high, in soft, deep muck, and with the stems set close together on the thicker (sometimes 1 cm.) rootstocks. A few attempts at riding through patches of *S. olneyi* resulted in each instance in the horse sinking and plunging, and barely getting out. So uniformly indicative of a mire was the plant that it was always avoided when riding in a swamp.

This was the common triangular-stemmed sedge of the desert marshes. It was found nearly everywhere, in Owens, Panamint, Death (Nos. 233, 569), Amargosa, and Vegas valleys. In this region the name *tule* is applied to the tall, coarse vegation of a marsh, of whatever plants it may be composed. Most of such marsh vegetation is made up of this species. The plant was not found in the Tulare Plains.

Scirpus pauciflorus Lightf. Fl. Scot. ii. 1078 (1777). Type locality, "upon the Highland Mountains, as upon Malghyrdy, in Breadalbane," Scotland.

Whitney Meadows (No. 1616).

Schœnus nigricans L. Sp. Pl. i. 43 (1753). Type locality European.

The range of this plant appears to follow none of the recognized rules of plant distribution. In the Old World it is known to occur in nearly all the countries of continental Europe, in several of the Mediterranean islands, in northern Africa, in southern Africa, in the Caucasus Mountains, and in the Baikal Mountains of southern central Siberia; in America it has been found thus far only in Florida and in southern California. Mr. S. B. Parish has collected the plant at Anaheim Hot Springs, and in Lone Pine Cañon, near Cajon Pass, San Bernardino Mountains; and it is now reported from the springs in Furnace Creek Cañon, Funeral Mountains (Nos. 229, 580), and from a small marsh about half a mile south of the Devil Hole, Ash Meadows, Nevada. The American plant is not differentiated from the European in any noticeable detail. In the two stations in which it was found by the expedition it occurred in wet, alkaline, calcareous soil.

Cladium mariscus (L.) Sp. Pl. i. 42 (1753), under *Schœnus;* R. Br. Prodr. Fl. Nov. Holl. i. 236 (1810). Type locality European.

Our southern species of *Cladium*, originally described by Torrey as *C. effusum*, occurs abundantly in the southern Atlantic States, and sparingly in the Great Basin (Arizona and Nevada) and on the southern Pacific coast. It is widely distributed in the warmer regions of the world, extending unusually far northward in Europe. Dr. Watson has described[1] our Western form as a variety, *californicum*, yet it is identical with others from Asia Minor and the Sandwich Islands, which Bœckeler has referred without comment to *C. mariscus*.

This was first seen about the springs in Furnace Creek (No. 231); in the margins of spring pools at the southern end of Resting Springs Valley; at Winters's ranch, Pahrump Valley; and at Watkins's ranch, Ash Meadows. The plant is confined to

[1] Bot. Cal. ii. 224 (1880).

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the marshy alkaline soil in the vicinity of springs, where it seldom occurs in abundance, but, in the last locality mentioned above, small areas of the open marsh are covered with it to the exclusion of all other large plants.

Carex[1] **ablata** Bailey, Bot. Gaz. xiii. 82 (1888). Type locality not given.
In a natural meadow near Mineral King, Sierra Nevada (Nos. 1426, 1437).

Carex amplifolia Boott in Hook. Fl. Bor. Amer. ii. 228 (1839). Type locality, "Columbia River."
In the valley of Kaweah River (No. 1354).

Carex atrata L. Sp. Pl. ii. 976 (1753). Type locality European.
Above timber line on Mount Whitney (No. 2073). [The nearest approach to the true variety *nigra* of the Alps which I have seen in this country.—L. H. B.]

Carex aurea Nutt. Gen. ii. 205 (1818). Type locality "on the shores of Lake Michigan."
Near Mineral King (No. 1429).

Carex breweri Boott, Ill. Gen. Carex, iv. 142 (1867). Type locality, "California, on Mount Shasta, 7,000–10,000 ft., in dry volcanic soil."
Above timber-line near Whitney Meadows (No. 1669).

Carex canescens dubia Bailey, Bot. Gaz. ix. 119 (1884). Type locality, "Bear River Cañon, Utah."
Near Mineral King (No. 1506). [Rare. Bear River Cañon, Utah; Wasatch Mountains, Utah; Blue Mountains, eastern Oregon.—L. H. B.]

Carex deweyana bolanderi (Olney) Proc. Amer. Acad. vii. 393 (1868), as *C. bolanderi*; W. Boott, Bot. Cal. ii. 236 (1880). Type locality, "California, Yosemite Valley and Mariposa Big-tree Grove."
Valley of Kaweah River (No. 1344).

Carex festiva Dewey, Amer. Journ. Sci. xxix. 246 (1836). Type locality, "at Bear Lake and on the Rocky Mountains." Collected by Richardson.
Mineral King (No. 1405) and Whitney Meadows (No. 1615).

Carex festiva stricta Bailey, Mem. Torr. Club, i. 51 (1889). Type localities, "California" and "Buck Creek, Oregon."
Near Mineral King (No. 1500). [This is a well-marked but very puzzling *Carex*, standing midway between *C. festiva* and *C. straminea*.—L. H. B.]

Carex filifolia Nutt. Gen. ii. 204 (1818). Type locality, "on the dry plains and gravelly hills of the Missouri."
Near Mineral King (No. 1505).

Carex filiformis latifolia Boeck. Linnæa, xli. 309 (1877). Type locality, "America septentr[ionali]."
Near Mineral King (No. 1438).

Carex incurva Lightf. Fl. Scot. ii. 544 (1777). Type locality European.
Above timber-line on a mountain slope near Mount Whitney (No. 2067). [Rare in America. This and *Carex atrata* are the only really boreal or alpine *Carices* in the collection.—L. H. B.]

Carex jonesii Bailey, Mem. Torr. Club, i. 16 (1889). Type locality, "Soda Springs, Nevada County, Cal., 7,000 feet."
Near Mineral King (No. 1428).

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[1] The specimens of the genus *Carex* have been identified by Professor L. H. Bailey.

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Carex marcida Boott in Hook. Fl. Bor. Amer. ii. 212 (1839). Type locality, "Columbia River."
Near Lone Pine (No. 2164).

Carex multicaulis Bailey, Bot. Gaz. ix. 118 (1884). Type locality Californian.
Valley of Kaweah River (No. 1366).

Carex nebraskensis prævia Bailey, Mem. Torr. Club. i. 49 (1889). Type locality not given.
Surprise Cañon, Panamint Mountains (No. 719).

Carex preslii Steud. Syn. Pl. Glum. ii. 242 (1855). Type locality, "Sinus Notka," i. e. Nootka Sound, Vancouver Island.
At and above timber-line in the Sierra Nevada (Nos. 1661, 2048).

Carex tenella Schk. Riedgr. 23 (1801). Type locality unknown.
Near Whitney Meadows (No. 1697).

Carex tolmiei subsessilis Bailey, Mem. Torr. Club, i. 47 (1889). Type localities, "E. Oregon," and "Gray's Peak, Colorado."
Near Mineral King (No. 1432) and near Whitney Meadows (No. 1706). [*C. tolmiei* is one of the most perplexing of the Western *Carices*, and this variety *subsessilis* is particularly puzzling. In some future revision of the species it will undoubtedly be found to be worthy of specific rank. It is distinguished from the species by the broader and more or less inflated soft perigynium, and by shorter, more sessile spikes. The strongly stoloniferous habit and broad leaves are also characteristic.—L. H. B.]

Carex utriculata minor Boott in Hook. Fl. Amer. ii. 221 (1839). Type localities, "British America," and "Rocky Mountains."
Near Mineral King (No. 1431). [A very much reduced form, which might be mistaken for some forms or *C. monile*.—L. H. B.]

GRAMINEÆ.[1]

Imperata hookeri Rupr. in Anders. Kong. Akad. Stock. Förh. xii. 160 (1855). Type locality, "in Texas."
This was observed along Furnace Creek (Nos. 219, 240); in the south end of Resting Springs Valley; at Ash Meadows; and in Surprise Cañon, near its mouth.

Andropogon macrourus Mx. Fl. i. 56 (1803). Type locality, "a Carolina ad Floridam, in humidis."
Furnace Creek Cañon, Funeral Mountains (No. 210). This grass occurred about springs and streams of fresh water in Furnace Creek Cañon, at Resting Springs, and at Ash Meadows.

Sorghum halepense Pers. Syn. Pl. i. 101 (1805). Type locality, "in Syria et Mauritiana."
A few plants were seen growing along the irrigating ditches at Furnace Creek Ranch, Death Valley (No. 245).

Hilaria mutica (Buckley) Proc. Acad. Phil. 1862, 95 (1863), under *Pleuraphis;* Benth. Journ. Linn. Soc. xix. 62 (1882.) Type locality, "northern Texas."
Near Crystal Spring, Coso Mountains (No. 915). [Not before recorded from California.—G. V.]

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[1] Determined by Dr. George Vasey.

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Hilaria rigida (Thurb.) Bot. Cal. ii. 293 (1880), under *Pleuraphis;* Scribner, Bull. Torr. Club, ix. 33 (1882). Type localities, "Fort Mohave and Providence mountains," "Fort Yuma," "Colorado Desert," and "along the Gila River."

The western limit of this grass, for the latitude of Death Valley, is the western foot-slopes of the Charleston Mountains. It was found along the road between Yount's ranch, in Pahrump Valley, and Mountain Springs Pass; on the eastern slope of the mountains, at the same pass; and in the northern end of Vegas Valley, extending a short distance over the divide between Towner's and Ash Meadows. In this vicinity it is a valuable forage grass.

Paspalum distichum L. Sp. Pl. ed. 2. i. 82 (1762). Type locality, "in Jamaica."
Near Visalia (No. 1281).

Panicum crusgalli L. Sp. Pl. i. 56 (1753). Type locality, "in Europæ, Virginiæ cultis."
At Furnace Creek Ranch (No. 242) and near Visalia (No. 1277).

Panicum dichotomum L. Sp. Pl. i. 58 (1753). Type locality, "in Virginia."
Near Three Rivers (No. 1286).

Panicum sanguinale L. Sp. Pl. i. 57 (1753). Type locality, "in America, Europa australi."
Near Visalia (No. 1279).

Phalaris intermedia angusta (Nees) in Mart. Fl. Bras. ii. pt. ii. 28 (1871), as *P. angusta;* Chapm. Fl. 569 (1860). Type localities, "in Brasilia meridionali, loco occuratius haud indicato," and "in America boreali obvia."
Near Visalia (No. 1282), and in the valley of the Virgin River (No. 1924).

Aristida bromoides H. B. K. Nov. Gen. & Sp. i. 122 (1815). Type locality, "in montibus regni Quitensis, juxta Tambo de Guamote et Llanos de Tiocaxas, alt. 1,600 hexap."
In the Funeral Mountains, near Saratoga Springs (No. 259).

Stipa viridula Trin. Mem. Acad. St. Pet. ser. 6. iv. pt. ii. 39 (1838). Type locality, "Am[erica] bor[eali]."

This grass was recorded on Lone Willow Peak, from the springs to the summit; on Browns Peak; in the southern part of the Funeral Mountains, near Saratoga Springs, and west of Amargosa (No. 328); in the Resting Springs Mountains; near Cottonwood Springs, Vegas Valley; in Johnson and Surprise cañons, Panamint Mountains; in a cañon of the Inyo Mountains, near Swansea; between Keeler and Crystal Spring; and on the east slope of Walker Pass. It confines itself principally to rocky mountain slopes, seldom occurring on open mesas, and therefore rarely seen in the bottoms of the desert valleys. It furnishes the best of grazing for stock.

Oryzopsis membranacea (Pursh) Fl. ii. 728 (1814), under *Stipa;* Vasey, Contr. Nat. Herb. i. 56 (1890). Type locality, "on the banks of the Missouri."

This plant, commonly known as sand grass, was of frequent occurrence on sandy or gravelly soil in the upper altitudes of the *Larrea* belt, yet it was seldom sufficiently abundant to furnish an appreciable amount of forage. Specimens were collected on the south slope of Browns Peak (No. 173), in Resting Springs Valley (No. 282), and near Keeler (No. 842).

Phleum alpinum L. Sp. Pl. i. 59 (1753). Type locality European.
Near Mineral King (No. 1400).

Sporobolus airoides (Torr.) Ann. Lyc. N. Y. i. 151 (1824), under *Agrostis;* Thurb. Bot. Cal. ii. 269 (1880.[1]) Type locality, "on the branches of the Arkansas, near the Rocky Mountains."

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[1] This appears to be the first real publication of the name *Sporobolus airoides.*

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U. S. DEPARTMENT OF AGRICULTURE.
DIVISION OF BOTANY.

CONTRIBUTIONS

FROM

THE U. S. NATIONAL HERBARIUM.

Vol. II—No. 3.

ISSUED MAY 10, 1894.

MANUAL OF THE PHANEROGAMS AND PTERIDOPHYTES OF WESTERN TEXAS.

BY

JOHN M. COULTER.

APETALÆ, MONOCOTYLEDONÆ, PTERIDOPHYTA.

PUBLISHED BY AUTHORITY OF THE SECRETARY OF AGRICULTURE.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF BOTANY,
Washington, D. C., December 5, 1893.

SIR: I have the honor to transmit herewith, for publication as Vol. II, No. 3, of Contributions from the U. S. National Herbarium, the third and final part of a Manual of the Phanerogams and Pteridophytes of Western Texas, by John M. Coulter. This brochure concludes Vol. II of the Contributions.

Respectfully,

FREDERICK V. COVILLE,
Botanist.

Hon. J. STERLING MORTON,
Secretary of Agriculture.

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PREFATORY NOTE.

The present part completes the Manual of the Phanerogams and Pteridophytes of Western Texas, issued as the second volume of Contributions from the U. S. National Herbarium, and contains the Apetalæ, Monocotyledonæ, and Pteridophyta. The great assistance furnished by Watson's Bibliographical Index and Gray's Synoptical Flora in the preparation of the previous parts was entirely lacking in this, and scattered monographs and lists have supplied our only information. In consequence of these conditions it has been impossible to present the material as satisfactorily as before, and this part of the manual gives most evidence that the publication is simply a bringing together of material which will prove of immediate service to local botanists and a convenience to all students of the North American flora. It is a matter of regret that the ranges of Texan plants can not be more definitely given; but many records are so meager that detailed information could not be furnished. It was also thought best, in this part, to conform as far as possible to the Rochester rules, although doubtless not all needful changes have been made. In this revision of names Dr. Elmon M. Fisher, one of my assistants, has been of great service. Mr. Frederick V. Coville has prepared the manuscript of the Juncaceæ, Prof. L. H. Bailey that of the genus *Carex*, Mr. L. H. Dewey that of the Gramineæ, and Prof. L. M. Underwood that of the Pteridophyta.

JOHN M. COULTER.

LAKE FOREST UNIVERSITY,
Lake Forest, Ill.

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+ + + + *Bristles 6, scabrous upwards: achene smooth.*

11. **R. filifolia** Torr. Stems 3 to 6 dm. high, filiform, erect: leaves setaceous: corymbs 2 to 4, distant, capitate: spikelets lanceolate, brown, densely clustered: bristles rigid, nearly as long as the achene and tubercle: achene minute, obovate, lenticular, smooth and shining, twice as long as the compressed triangular-ovate ciliate tubercle.—South Atlantic and Gulf States to Texas.

12. **R. fuscoides** Clarke. Stems 1.5 to 4.5 dm. high, erect: leaves linear: corymbs capitate, in pairs at the summit of the stem, and often with a third rather distant lateral one: spikelets ovate, brown: bristles as long as the oval or orbicular, lenticular, dark brown achene (rarely twice as long): tubercle white, conical, obtuse. (*R. fascicularis* var. *distans* Chapm.)—Florida and Texas (*Hall*).

13. **R. gracilenta** Gray. Stems (3 to 6 dm. high) and leaves filiform or setaceous: corymbs 2 or 3, distant, capitate, brown: spikelets densely clustered, ovate-lanceolate: bristles twice as long as the oval dull achene, which is as long as the slender subulate tubercle.—From the south Atlantic and Gulf States to Texas.

14. **R. Grayii** Kunth. Stem solitary, 6 to 9 dm. high, 3-angled: leaves linear, rigid, shining: corymbs 3 or 4, distant, capitate: spikelets few, large, ovate: bristles as long as the achene and tubercle: achene round-obovate, tumid, slightly pitted, dull; tubercle short-conical, dilated at base.—From the south Atlantic States to Texas.

+ + + + + *Bristles scabrous upwards: achene transversely rugose.*

15. **R. cymosa** Nutt. Stems 6 to 9 dm. high, 3-angled: leaves narrowly linear: corymbs mostly 3, distant, open or contracted: spikelets ovate, clustered, light brown: scales mucronate: achene broadly obovate, lenticular, faintly rugose, twice as long as the 3 to 6 bristles; tubercle broadly conical, compressed, a fourth as long as the achene.—From the Atlantic and Mississippi Valley States to Texas.

16. **R. rariflora** Ell. Stems (3 to 4.5 dm. high) and leaves bristle form, the former commonly reclining: corymbs 2 or 3, remote, spreading: spikelets few and scattered, ovate, pedicelled: achene broadly obovate, lenticular, strongly rugose, twice as long as the 6 fragile bristles; tubercle flat, broadly conical, a third as long as the achene.—From the south Atlantic States to Texas.

17. **R. microcarpa** Baldwin. Stems 6 dm. high, erect, slender, nearly terete: leaves narrowly linear: corymbs 4 to 6, slender, spreading, compound: spikelets small, round-ovate, scattered: bristles 5 or 6, as long as the round-obovate lenticular strongly rugose achene, which is tipped with a very short and broad tubercle.—From the south Atlantic States to Texas.

18. **R. caduca** Ell. Stems stout, 9 to 12 dm. high, 3-angled: leaves broadly linear: corymbs 4 to 6, compound, remote, the branches and short pedicels erect: spikelets very numerous, approximate, ovate: scales caducous: bristles 6, slender, twice as long as the obovate lenticular faintly rugose achene (4 to 8 on the spikelet): tubercle flat, conical, ciliate, half as long as the achene.—From the south Atlantic States to Texas.

19. **R. schœnoides** Britton. Stems 6 to 9 dm. high, 3-angled: leaves linear: corymbs 3 to 5, compound, the lower ones remote: spikelets small, ovate, crowded: bristles 6, strongly hispid, as long as the achene and tubercle: achene obovate, flattened, strongly rugose; tubercle broadly conical, flat, a fourth as long as the achene. (*R. Elliottii* Dietr. *R. multiflora* Gray.)—South Atlantic States to Texas (near Sabine Pass).

20. **R. patula** Gray. Stems 6 to 9 dm. high, 3-angled, slender above: leaves linear: corymbs 3 to 5, remote, compound, widely spreading: spikelets scattered, ovate, on slender stalks: bristles 6, rather longer than the round-obovate lenticular achene: tubercle flat, conical, ciliate on the edges, half as long as the achene.—South Atlantic States to Texas.

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21. **R. inexpansa** Vahl. Stems nearly terete, slender, 3 to 9 dm. high: leaves narrowly linear: corymbs 4 or 5, narrow, remote, compound, drooping: spikelets scattered, lanceolate: bristles 6, very slender, twice as long as the lanceolate-oblong compressed achene, which is twice as long as the conical-beaked tubercle.—South Atlantic States to Texas (near Sabine Pass).

11. CLADIUM P. Browne. (TWIG-RUSH.)

Stems tall, with ovoid or oblong spikelets of several loosely imbricated scales (the lower empty, 1 or 2 above bearing a staminate or imperfect flower, the terminal flower perfect and fertile), no perianth, 2 stamens, 2 or 3-cleft deciduous style, and an ovoid or globular achene somewhat corky at summit, or pointed, but without any tubercle.

1. **C. effusum** Torr. Stems 12 to 24 dm. high, nearly terete: leaves linear, elongated, saw-edged: panicles numerous, diffuse: spikelets small, 3 or 4 in a cluster, deep brown: scales about 6: achene ovate, pointed, wrinkled.—Fresh or brackish marshes, along the whole Gulf coast, and extending to the southwestern borders of Texas. Known as "saw-grass."

12. SCLERIA Berg. (NUT-RUSH.)

Perennials, with triangular leafy stems mostly from creeping rootstocks, inflorescence of terminal and axillary clusters (the lower clusters usually peduncled), monœcious flowers (fertile spikelets 1-flowered, usually intermixed with clusters of few-flowered staminate spikelets), oosely imbricated scales (lower empty), 1 to 3 stamens, 3-cleft style, no bristles, and a globular achene, stony, bony, or enamel-like in texture. All in low ground or swamps.

* *Achene smooth.*

1. **S. triglomerata** Michx. Stems (4.5 to 9dm. high) and broadly linear leaves roughish: fascicles of spikelets few, the lowest peduncled, the upper somewhat in threes: achene ovate-globose or depressed, on an obscure crustaceous disk.—Eastern United States, and extending into Texas.

2. **S. oligantha** Ell. Stems slender, 6 dm. high, the angles somewhat winged: leaves linear (4 mm. wide), smooth except the scabrous apex: lateral fascicles 1 or 2, usually on long exserted peduncles: achene ovate, on a tuberculate disk.—South Atlantic States to Texas.

** *Achene papillose or reticulated and wrinkled.*

3. **S. pauciflora** Muhl. Smoothish or hairy: stems slender, 20 to 60 cm. high: leaves narrowly linear: fascicles few-flowered, the lateral pedunculate, sessile, or wanting: bracts ciliate: achene globose-ovate, papillose or warty: the disk a narrow ring bearing 3 pairs of minute tubercles.—Eastern United States and extending into Texas.

4. **S. Torreyana** Walpers. Stems weak, diffuse, slightly scabrous or smooth: leaves linear (4 to 8 mm. wide), smooth: lateral fascicles loose, on more or less elongated and drooping filiform peduncles: achene irregularly pitted-reticulated or pitted-rugose with the ridges somewhat spirally arranged and more or less hairy (sometimes smooth). (*S. laxa* Torr.)—Pine-barrens from the south Atlantic States to Texas.

13. CAREX Ruppius. (SEDGE)

By L. H. BAILEY.

Perennial grass-like herbs, with 3-ranked leaves and mostly triangular stems, unisexual flowers borne in spikes and destitute of floral envelopes, the staminate consisting of three stamens borne in the axil of a bract or

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scale and usually disposed in the terminal portion of the inflorescence or spike, the pistillate flowers composed of a single 2-styled or 3-styled pistil which forms in fruit a lenticular or triangular hard achene, and which is contained in a close sac or *perigynium* which, in turn, stands in the axil of a bract or scale.

§ 1. CAREX proper. *Staminate flowers aggregated in one or more terminal cylindrical or club-shaped spikes (sometimes pistillate at base or apex): pistillate flowers usually in distinct and simple mostly peduncled spikes: cross-section of perigynium usually prominently triangular in outline or at least never lenticular: styles mostly 3-parted and achene triangular or triquetrous.*

1 * *Perigynium mostly straw-colored at full maturity, papery in texture, usually more or less inflated, smooth (in our species), nerved, tapering as long as or longer than the body: spikes few to many, distinct, compactly flowered, erect or drooping: stigmas 3.*—PHYSOCARPÆ.

+ *Mature perigynium greenish-tawny (very rarely clear yellow), very long and taper-pointed and prominently inflated below: spikes 3 or more: the staminate mostly one and stalked, the pistillate mostly rather short and thick (except in No. 2), and usually becoming dark colored in drying: scales much shorter than the perigynium.*

++ *Perigynia prominently ascending at maturity.*

1. **C. lupulina** Muhl. Very stout and leafy, often 1 m. high: spikes 2 to 6, erect, approximate at the top of the culm, all closely sessile or the lower sometimes short peduncled, oblong or short-cylindrical, very heavy and densely flowered and hop-like (whence the name): staminate spike small and mostly sessile: perigynium very large and rather soft.—Bogs and wet places throughout the eastern states. In Texas perhaps represented only by var. PEDUNCULATA Dewey, in which the spikes are more or less scattered and some or all prominently peduncled, and the staminate spike usually long peduncled. (*C. gigantea* Rudge. *C. lupulina* Olney, Hall's Pl. Tex., No. 756.)—Houston (*Hall*) and probably westward.

++ ++ *Perigynia divaricate at maturity.*

2. **C. grandis** Bailey. Tall and rather slender: spikes erect, much scattered and all (or all but the upper one) peduncled, 5 to 8 cm. long, evenly and comparatively cylindrical and more loosely flowered than in the last species: perigynium smaller below, but very abruptly contracted into a slender and spreading beak 3 to 4 times as long as the body and 2 to 3 times longer than the narrow thin scale.—Swamps and ponds, Kentucky and Delaware southward to our eastern limits.

3. **C. Louisianica** Bailey. Slender, usually low (30 to 50 cm.), the leaves flat and narrow: staminate spike usually one, carried on a long and very thin stalk: pistillate spikes one to three, somewhat scattered, only the lowest one or two peduncled, short (usually about globular, never over twice longer than broad), subtended by leafy bracts, becoming almost yellow at maturity: perigynium very turgid and long-conical, shining, three or four times the length of the very small scale. (*C. Halei* Carey, not Dewey. *C. intumescens* Olney, Hall's Pl. Tex., No. 755).—In ponds and bogs, Florida to our eastern limits. The southern representative of *C. intumescens* Rudge.

+ + *Mature perigynium yellowish-tawny, mostly abruptly contracted into a very slender straight beak, smaller and much less inflated than in + : spikes mostly regularly cylindrical and usually stalked, not discoloring in drying if mature: scale (in ours) awl-like and nearly as long as the perigynium.*

4. **C. lurida** Wahl. Tall and spreading (5 to 10 dm. high), very leafy: spikes aggregated at the top of the culm, the pistillate 2 to 4 and short-stalked, 2 to 5 cm.

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long, spreading or drooping: perigynium thin and mostly shining, rather lightly about 10-nerved, ascending. (*C. tentaculata* Muhl.)—Swales, east of the Mississippi and to central Texas. Variable.

← ← ← Perigynium less inflated than in ← ←, more conspicuously nerved, and the teeth of the beak more or less setaceous: spikes nodding, comose or bristly in appearance.

5. **C. hystricina** Muhl. Slender but erect (3 to 7 dm.), with a sharp and rough culm and narrow leaves: pistillate spikes 1 to 3, approximate near the top of the culm, 2 to 5 cm. long, the lower one or two on filiform stalks, whitish or greenish-white in appearance, especially before pressed: perigynium very strongly 15 to 20-nerved, the very slender beak strongly toothed, smaller than in No. 4: scale linear and rough, nearly or quite as long as the perigynium.—Swales, probably throughout western Texas.

← ← ← ← Mature perigynium tawny-yellow, obconic or obovoid, densely packed in short spikes.

↔ Terminal spike normally staminate.

6. **C. Frankii** Kunth. Stiff and very leafy but low (3 to 6 dm.), with an obtusely angled and smooth culm: pistillate spikes 3 to 5, the lower one or two short-stalked but erect, the remainder sessile on the zigzag top of the culm, all short (2.5 to 3 cm.) and evenly cylindrical and sometimes staminate at the top: perigynium very abruptly contracted into a short but slender beak which is usually shorter than the bristly scale. (*C. stenolepsis* Torr., not Less.)—Meadows and low places, Pennsylvania to Texas. The terminal spike is occasionally androgynous.

↔ ↔ Terminal spike densely pistillate above.

7. **C. squarrosa** L. Somewhat slender (5 to 10 dm. high), in clumps, with flat and weak leaves and sharp culm: spike sometimes single, but usually there are two or three, the lower ones being near the terminal one and short-peduncled, sometimes even nodding, all oblong, conical-oblong, or oblong-cylindric and exceedingly densely packed with pergynia, nut-brown: perigynium larger than in the last, the beak rough: scale short and usually entirely hidden.—Grassy places and copses, New England to Arkansas and evidently reaching our limits.

2 * *Perigynium dull, mostly large, thick and hard in texture, straight-beaked, not inflated: pistillate spikes mostly large and compactly flowered, erect or nearly so: stigmas 3.*—TRACHYCHLÆNÆ.

8. **C. riparia** W. Curtis. Very stout and large (6 to 15 dm. high), from creeping roots, with broad, thick and glaucous leaves: staminate spikes usually 2 or 3, aggregated on a common stalk: pistillate spikes 2 to 4, scattered and more or less peduncled, the lowest often very long-stalked, ordinarily 5 to 10 cm. long, mostly loosely flowered below: perigynium ovate-lanceolate, rather lightly many-nerved and becoming shining, the beak short and thick: scale various, mostly shorter than the perigynium.—Swales, throughout most of the United States, reaching part way across Texas.

3 * *Distinguished from 2 * by the much smaller and short perigynium, which is only slightly or not at all beaked and which is much thinner in texture, by very narrow slender spikes, and stigmas 2* (3 in No. 11).—MICRORHYNCHÆ.

← Pistillate scales not awned, mostly not exceeding the perigynium.

9. **C. stricta** Lam. Tall and slender, but erect (5 to 15 dm. high), forming dense tussocks when growing in boggy places, the culm sharp and leaves long and narrow: pistillate spikes 3 to 5, variable in size, 2.5 to 7 cm. long and narrowly cylindrical, compactly flowered above but often alternate at the base, scattered, the

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lowest one or two usually more or less peduncled and somewhat clavate and subtended by leafy bracts equaling or surpassing the culm and spreading or nodding, the remainder sessile and often staminate at the top, all greenish-purple or pallid: perigynium small and ovate, tawny, mostly very lightly few-nerved and somewhat granular, the beak very short and commonly entire.—Swales, throughout the eastern states to Texas. Var. EMORYI Bailey, (*C. Emoryi* Dewey) with spikes usually heavier and more densely flowered and often more numerous, the pistillate ones obtuse if not staminate at the apex, the lower bracts usually very long and leaf-like, is a stiffer plant than the species and evidently much commoner in Texas.

+ + Pistillate scales awned, mostly exceeding the perigynium.

10. **C. crinita** Lam. Robust and usually stout (6 to 10 dm. high), growing in clumps, with sharp culm and flat rather broad striate leaves: spikes 3 to 6, somewhat scattered and variously peduncled, mostly secund, curved and drooping (or in very small forms almost erect), 5 to 10 cm. long, narrowly and evenly cylindrical, compactly flowered but often alternate below and usually staminate at the top: perigynium ovate, thin, and puncticulate, obscurely nerved, the minute point entire, falling easily when mature: scale rough-awned, 2 or 3 times longer than the perigynium.—Swales, Canada to Florida and Texas.

11. **C. verrucosa** Muhl. Stout and stiff (6 to 10 dm. high), rather pale throughout, culm sharp, leaves very rough and long-pointed and rolling when dry: staminate spikes one or two, comparatively short (terminal one 2.5 to 4 cm.), and elevated on a short stalk: pistillate spikes 3 to 7, approximate or the lowest one remote, variously peduncled or the uppermost oftenest sessile, the lowermost nodding, all rather thick and evenly cylindrical (2.5 to 7 cm. long), glaucescent, frequently staminate at the top: perigynium slightly obovoid, or buckwheat-shaped, lightly veined, the minute point entire, a half or third as long as the laciniate awn of the thin wide-bottomed scale: stigmas 3, and achene trigonous. (*C. scaberrima* Scheele, probably.)—Margins of ponds and low pine woods, Virginia to Florida and Texas. Terminal spike sometimes androgynous.

4* *Perigynium mostly light-green or whitish when fresh, thin and membranaceous (thickish in No. 12), often somewhat inflated or loosely investing the achene, smooth and mostly shining (in ours) at full maturity, usually oblong or slender (short in No. 12): pistillate spikes several or many, and in most of the species on spreading or nodding stalks: bracts leaf-like: stigmas 3.*—HYMENOCHLÆNÆ.

+ Terminal spike normally pistillate at the top.

++ Pistillate spikes oblong or short-cylindric, dense, and erect

12. **C. triceps** Michx. Small and slender (15 to 40 cm. high): leaves smooth, or rarely sparsely hairy below: sheaths hairy or puberulent: spikes small, 15 mm. or less long, contiguous, and sessile: perigynium narrowly ovate or cylindrical-ovate, ascending: pistillate scale white-hyaline, the mid-nerve extended into a short and often hispid awn.—Woods and glades, Carolina to central Texas. Var. SMITHII Porter is usually more slender, olive-green, smooth throughout or lower sheaths puberulent: spikes evenly cylindrical and more scattered, the lower one or two usually short-peduncled: perigynium nearly globular or globular-ovate, somewhat turgid, standing at right angles to the rhachis when mature: scales normally more obtuse. (*C. Smithii* Porter.)—New Jersey and Pennsylvania to our eastern limits.

++ ++ Pistillate spikes long-cylindric or linear, loose and spreading.

13. **C. oxylepis** Torr. & Hook. Very slender but erect, 3 to 7 dm. high, with short and soft flat leaves, which are slightly hairy below: pistillate spikes 3 or 4, approximate near the top of the culm or the lowest one remote, about 2.5 cm. long, variously peduncled and spreading or the lowest nodding: perigynium angular and

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scarcely inflated, ovate-oblong, pointed but not toothed, prominently few-nerved, rarely slightly pubescent, equalling or more commonly surpassing the thin sharp scale.—Wet woods and grassy places, from our eastern region to Florida and South Carolina.

14. **C. Davisii** Schw. & Torr. Taller than the last, with broader leaves and a laxer habit, smooth throughout: perigynium conspicuously inflated and toothed.—Rich woods and meadows, Massachusetts and Minnesota, southward to Georgia and Texas.

+ + Terminal spike normally entirely staminate.

++ Perigynium not beaked, finely striate, more or less inflated: spikes erect.

= Terminal (staminate) spike sessile or very nearly so, and oblique.

15. **C. flaccosperma** Dewey. Low (3 to 5 dm.) glaucous, the culm slender, leaves often very broad (4 to 6 mm.) and flat and comparatively short: staminate spike springing from the base of the upper pistillate spike, short (often less than the pistillate-spike) and oblique: pistillate-spikes 3 to 5, the two uppermost usually together at the top of the culm and sessile and the others more or less remote and slenderly peduncled, rather densely flowered, about 2 to 2.5 cm. long, rust-colored: perigynium oblong cylindric soft, narrowed to a point, twice or thrice longer than the sharp very small scale. (*C. microsperma* Steud.)—Wet grassy places, Florida to central Texas.

16. **C. grisea** Wahl. Habitually somewhat taller than the last, green, leaves flat and rather broad (3 to 5 cm.), lax and usually overtopping the culm: staminate spikes borne as in No. 15: pistillate disposed as in No. 15, also green, some of them occasionally reduced to two or three perigynia: perigynium oblong, pointless, prominently turgid, all but the lowest longer than the narrow-nerved scale.—Moist grounds, Canada to Texas and New Mexico (*Wright*).

= = Terminal spike more or less stalked and erect.

17. **C. amphibola** Steud. Slender and erect (25 to 50 cm.), often stiff, green, the leaves scarcely half so wide as in Nos. 15 and 16: spikes slender and loosely flowered: perigynium scarcely inflated, triangular, oblong, narrowed into a sharp beak-like point, 2-ranked on the spike: scales nerveless and long-awned, spreading. (*C. grisea*, var. *angustifolia* Boott, and var.? *rigida* Bailey. *C. grisea* Olney Hall's Pl. Tex., No. 741, and var. *minor*, No. 743. *C. cryptandra* Olney, Hall's Pl. Tex., No. 742.)—Grassy places, New Jersey to Florida and Texas. Lower forms with shorter perigynia are var. GLOBOSA. (*C. grisea*, var. *globosa* Bailey.)

++ ++ Perigynium prominently beaked, prominently few-nerved, not inflated: spikes (in ours) flexuose or nodding, linear.

18. **C. debilis** Michx. Very slender and diffuse (4 to 6 dm. high), with narrow soft leaves: pistillate spikes 3 or 4, scattered or the two uppermost contiguous, all on filiform stalks of varying lengths, linear (2 to 4 cm. long), loosely flowered: perigynium linear-ovate and very long, twice or more longer than the bluntish very thin scale.—South Carolina to central Texas.

++ ++ ++ Perigynium (in ours) very short-beaked and few-nerved, not inflated and firm in texture: spikes spreading or erect, heavy.

19. **C. Cherokeensis** Schw. Tall (5 to 7 dm.) and rather stiff, pale throughout, the very long pointed leaves rough: pistillate spikes 3 to 12, often 2 or 3 from a sheath, scattered along the upper part of the culm, the very uppermost sessile, or nearly so; the others variously rather short-peduncled, 2 to 5 cm. long and densely flowered, pale, often staminate at the apex: perigynium ovate, very few-nerved, the short cylindrical beak entire: scale acute and about the length of the perigynium. —Banks and woods, Georgia to central Texas.

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5 * *Perigynium firm and rusty, smooth or minutely granular, nerved, not inflated, mostly short-beaked with an entire orifice: pistillate spikes compactly flowered and mostly short and erect, fuscous: stigmas 3.*—SPIROSTACHYÆ.

20. **C. microdonta** Torr. & Hook. Erect and rather strict 25 to 50 cm. high, the leaves short and flat (often becoming involute when dry), 3 to 4 mm. wide: pistillate spikes (2 or 3) all scattered, the lowest one usually radical or nearly so, and long peduncled, erect, 2 to 3 cm. long: bracts sheathing: perigynium ovate, prominently pointed, finely nerved, about equaling the sharp hyaline scale. (*C. alveata* Boott. *C. Rœmeriana* Scheele. *C. Wrightii* Dewey.)—Wet prairies and woods, Mississippi to central Texas. Var. LATIFOLIA Bailey, of wet prairies, has leaves very short (7 to 12 cm.) and very broad (6 cm.), many-nerved, long-acuminate, and the sheaths loose and conspicuous.

6 * *Perigynium firm, greenish or green-tawny, mostly short and triangular and bearing a short straight or curved beak, scarcely inflated: pistillate spikes short (seldom exceeding 2.5 cm.) and except in No. 24 very loosely flowered, the scales whitish or purple margined: bracts sheathing.*—DACTYLOSTACHYÆ.

+ Spikes loosely or even alternately flowered.

21. **C. laxiflora** Lam. Slender but usually erect, 3 to 5 dm. high, the leaves soft and nearly flat and rarely over 3 to 4 cm. wide: staminate spike peduncled or at least conspicuous: pistillate spikes 2 to 4, scattered, peduncled or the top one sessile, cylindric or sometimes short-oblong, erect or the lowest one or two spreading: perigynium obovate, conspicuously nerved, the short entire beak much bent or even recurved: scale thin and whitish, blunt or cuspidate, mostly shorter than the perigynium. (*C. truncata* Bœckl. *C. laxiflora*, var. *intermedia* Boott. *C. laxiflora*, var. *styloflexa* Olney, Hall's Pl. Tex., No. 750, at least in part.)—Grassy places, Canada to the Gulf and central Texas. Var. BLANDA Boott is diffuse, with broader leaves, staminate spike mostly sessile and inconspicuous, pistillate spikes seldom over 15 mm. long, the upper ones sessile and more or less aggregated, the lowest one or two usually long-exserted. (*C. blanda* Dewey *C. laxiflora*, var. *striatula* Carey.)

22. **C. Styloflexa** Buckley. Very slender, the culms long (3 to 5 dm.) and weak, the leaves 2 to 3 mm. wide: staminate spike commonly peduncled: pistillate spikes 2 or 3, scattered in the typical forms but sometimes aggregated and sessile near the top of the culm, few-flowered, the lowest ones normally drooping: perigynium prominently triangular with a long and nearly straight point. (*C. acuminata* Schw. *C. protracta* and *C. Chapmanni* Steud. *C. fusiformis* Chapm. *C. styloflexa* Buckl. *C. laxiflora*, var. *styloflexa* Boott.)—Pennsylvania to Florida and Texas.

23. **C. striatula** Michx. Usually tall and very slender but mostly strict, with very narrow leaves: staminate spike long-peduncled: pistillate spikes scattered, the lowest slenderly peduncled, all loosely or alternately flowered, not over 2 to 3 cm. long: perigynium long-pointed and but little curved, triquetrous, finely many-nerved, much longer than the very thin scale. (*C. ignota* Dewey *C. laxiflora*, var. *Michauxii* Bailey.)—Carolina to Florida and Texas.

++ Spikes compactly flowered, especially above the base.

24. **C. tetanica** Schk., var. **Meadii** Bailey. Strict, 25 to 50 cm. high: staminate spike single, clavate, and stalked: pistillate spikes 1 to 3, the upper one sessile or nearly so and the others more or less peduncled and sometimes loosely flowered at the base, all erect, 2.5 cm. or less long, rather thick above the base: perigynium somewhat turgid or at least plump, greenish when fresh, and prominently many nerved, the short beak strongly bent: scale bluntish or at most short-acute, rarely exceeding but mostly not equalling the perigynium. (*C. Meadii* Dewey. *C. panicea*, var. *Meadii* Olney, Hall's Pl. Tex., No. 739.)—Meadows and moist woods, Rhode Island to Nebraska and southward to central Texas.

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7* *Perigynium mostly short and rounded, triquetrous in No. 27, firm or even hard in texture, not inflated, sometimes hairy, the beak straight and usually bifid or erose: pistillate spikes few-flowered, usually globular or very short-oblong, more or less sessile and approximate at the top of the culm or some of them radical: bracts sheathless: stigmas 3, or rarely 2.*—SPHÆRIDIOPHORÆ.

← *Perigynium globular with a flattened beak.*

25. **C. varia** Muhl., var. **australis** Bailey. Strongly stoloniferous, the wiry culms rising from the mass of narrow leaves to a height of 3 to 5 dm.: terminal spike straight and prominent, sessile, 1 to 1.5 cm. long: pistillate spikes 2 to 4, all small and sessile, contiguous on the top of the culm but distinct from each other, greenish: perigynium small, hairy, the body hard and globular, contracted into a flat beak which about equals the greenish or brown-margined scale. (*C. Emmonsii* Olney, Hall's Pl. Tex., No. 752.)—Dryish woods and copses, Mississippi to Texas.

26. **C. Floridana** Schw. Culms very low and slender, from 2.5 to 12 cm. high, very much overtopped by the long thick persistent leaves: staminate spike single and partially hidden in the terminal cluster of pistillate spikes: some of the pistillate spikes radical, others clustered at the top of the culm and closely sessile, all greenish or whitish, or occasionally slightly variegated by lightly purple-margined scales: perigynium much as in the last, almost smooth.—South Carolina to Florida and Texas (*Reverchon. Thurow.*) Little known.

← ← *Perigynium triquetrous.*

27. **C. planostachys** Kunze. Low, the culms from 2.5 to 12 cm. high, overtopped by the narrow and rather stiff leaves: staminate spike single and small, sessile or very nearly so at the base of the uppermost pistillate spike: pistillate spikes partly radical and partly approximate and short-stalked near the top of the culm, loosely few-flowered on a zigzag rachis: perigynium either minutely tomentose or smooth, strongly many nerved, the beak terete and entire or very nearly so. (*C. Halleriana* American authors, not Asso.)—Dry uplands throughout Texas and in Mexico. This species differs from its European and African representative, *C. Halleriana*, to which it has been referred, by its habitually lower stature, culms much shorter than the leaves, more uniformly stalked spikes, the filiform bracts, zigzag rachis of the spikes, more pronounced beak of the perigynium, and sharper scales.

8* *Perigynium hard with a globular body and long flattened beak: spike single, staminate above and pistillate below, the pistillate flowers few: scales prolonged and bract-like: stigmas 3.*—PHYLLOSTACHYÆ.

28. **C. Willdenovii** Schk. Low, culms 7 to 15 cm. high and shorter than the rather stiff leaves, pale: pistillate flowers 3 to 9: perigynium prolonged into a prominent 2-edged very rough beak: scales chaffy, nerved, as broad as the perigynium and somewhat longer or the lowest sometimes overtopping the spike. Var. PAUCIFLORA Olney is a form with fewer pistillate flowers.—Copses, New England to North Carolina and central Texas.

9* *Perigynium thin in texture, green, oblong to linear and beakless: spike one, staminate above, thin and slender: stigmas 3.*—LEPTOCEPHALÆ.

29. **C. leptalea** Wahl. Culms and leaves capillary, 15 to 40 cm. high, in tufts, leaves mostly not exceeding the culm: spike 4 to 10 mm. long, linear, the staminate portion very small: perigynium nerved, about twice longer than the obtuse caducous scale. (*C. polytrichoides* Muhl.)—Bogs, throughout most of the United States.

§ 2. VIGNEA. *Staminate flowers few and inconspicuous and borne at the base or apex of the pistillate spikes: pistillate flowers in short sessile spikes which are commonly more or less aggregated into heads or even panicled: perigynium plano-convex: styles 2, and achene lenticular.*

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* *Staminate flowers borne at the apex of the spikes.*—ACROARRHENÆ.

+ *Perigynium thick in texture and spongy at the base, mostly stipitate, conspicuously nerved: inflorescense in No. 30 nearly a panicle.*

30. **C. crus-corvi** Shuttlw. Very stout, 7.5 to 10 dm. high, glaucous, leaves flat and very wide: head much bracted and compound, 6 to 15 cm. long: perigynium long-lanceolate, the short cushion-like base very thick, the roughish and very slender beak thrice the length of the body, and three to four times the length of the inconspicuous scale. (*C. Nuttallii* Olney, Hall's Pl. Tex., No. 833.)—Bogs, Minnesota to Florida and Texas.

31. **C. stipata** Muhl. Stout, 3 to 8 dm. high, green, in clumps, the culm rather soft and very sharply angled: head 2 to 6 cm. long, rarely somewhat compound at base, interrupted, the lowest spikes of 1.5 cm. long: perigynium lanceolate, brown-nerved, the beak toothed and slightly rough, about twice the length of the body and much longer than the scale.—Swales, Canada to our eastern limits.

++ *Perigynium mostly very small and short and nearly nerveless (in ours), not spongy at the base: head yellow or tawny, mostly long.*

32. **C. triangularis** Bœckl. Stiff and erect, 3 to 7.5 dm. high, the narrow leaves mostly shorter than the culm: head 2 to 5 cm. long and usually interrupted below, simple, dull tawny-brown at maturity: spikes short-oblong and truncate at the apex, the perigynia conspicuously spreading: bracts few and inconspicuous, or absent above the base of the head: perigynium broadly ovate or round-ovate, minutely nerved and often slightly dotted. (*C. vulpinoidea*, var. *platycarpa* Olney, Hall's Pl. Tex., No. 729. Var. *Drummondiana* Bœckl.)—Wet places and prairies, Mississippi to Indian Territory and central Texas.

+ + + *Perigynium mostly short-ovate, mostly glossy at maturity, often nerved, not spongy at the base (except in Nos. 33 and 34): head green or nearly so when mature (light tawny in Nos. 34 and 35), mostly short.*

++ *Head loose and very slender: perigynium spongy at base.*

33. **C. Texensis.** Very slender, 2 to 4 dm. high, the leaves loose and mostly very narrow: head 1.5 to 3 cm. long, open below, green: perigynium lanceolate, smooth or nearly so, spreading at right angles to the rachis. (*C. rosea*, var. *Texensis* Torr.)—Dry places, southern Illinois to Alabama and Texas. A delicate and pretty species.

34. **C. retroflexa** Muhl. Slender but rather stiff, 3 to 5 cm. high: head much as in the last but tawny: perigynium ovate, smooth, very corky at the base, which is contracted until almost stipitate, at full maturity widely spreading or even reflexed: scale brownish and sharp, at length deciduous. (*C. rosea*, var. *retroflexa* Torr.)—Throughout the States east of the Mississippi and in Indian Territory and central Texas.

++ ++ *Head dense and stout: perigynium not spongy at base.*

35. **C. Leavenworthii** Dewey. Low (15 to 25 cm. high) but erect, the culms mostly overtopping the very narrow long-pointed leaves: head globular or globular-oblong and very small, tawny: perigynium very small, ovate and beaked, entire, rather thin, the edges rounded, about the length of or a little shorter than the thin acute scale. (*C. cephalophora*, var. *angustifolia* Boott. *C. cephalophora* Olney, Hall's Pl. Tex., No. 732.)—Grassy places, Ontario to Texas. Nearer the *C. rosea* group than to *C. cephalophora*.

36. **C. cephalophora** Muhl. Slender but mostly strict, 3 to 5 cm. high, pale: head small (rarely exceeding 1.5 cm.) but rather broad, especially at the base, and very dense, never interrupted, green, the lower one or two spikes of the head bearing a very setaceous short bract: perigynium twice larger than in the last, green and

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often glossy, sharp-edged, scarcely longer than the rough-cuspidate scale.—Throughout the eastern United States on dry knolls and banks.

37. **C. Muhlenbergii** Schk. Very stiff, the culm 3 to 7.5 cm. tall and much prolonged beyond the few narrow and at length involute long-pointed leaves, pale throughout: head 2 cm. or less long, usually heavy, but the individual spikes clearly defined: spikes 4 to 8, globular: perigynium nearly circular, glossy, very strongly nerved on both faces, spreading, falling easily at maturity: scale rough-cuspidate, about as long as the perigynium but narrower.—Dry and poor soil, throughout the eastern States and in Texas. Variable in the nerving of the perigynium. When nerveless it becomes var. ENERVIS Boott. A common Texan form is var. AUSTRALIS Olney, distinguished by perigynium nerveless or nearly so, scales very sharp and prominently nerved, and especially by the bracts being dilated at the base and prolonged.

* * *Staminate flowers borne at the base of the spikes.*—HYPARRHENÆ.

38. **C. straminea** Willd. Slender and erect, or the top of the culm often flexuose, 3 to 9 dm. high, the culm mostly longer than the narrow and long-pointed stiff leaves: spikes 3 to 8, tawny or straw-colored, small (3 to 6 mm. broad), globular or occasionally somewhat tapering below from the presence of many staminate flowers, commonly all entirely distinct on the very slender often zigzag or flexuose rachis: bracts none, or at least only the very lowest ones conspicuous: perigynium small and ovate, nearly flat, lightly nerved on both faces, the points spreading and rather conspicuous: scale acute, about the length of the perigynium.—Dry banks and fields throughout the eastern United States and in Texas. Var. BREVIOR Dewey, with stiffer culm, larger and more aggregated spikes in a short erect head, and broader perigynium, occurs within our territory. Var. HYALINA Boott is tall and slender: spikes much contracted below, medium in size: perigynium very thin, flat, and scale-like, the wide-nerved margin wrinkled above, produced into a very long and slender beak which give the spikes a comose appearance: scale small and inconspicuous.—Florida to central Texas.

39. **C. albolutescens** Schw. Culm very stiff, longer than the long-pointed leaves: spikes 4 to 8, contiguous or the lower ones separated, erect or ascending, prominently contracted both above and below, very densely flowered, green or silvery-green. (*C. straminea*, var. *fœnea* Torr.)—Near the seacoast from New Brunswick to Mexico, in Texas reaching as far inland as Houston, and probably farther.

40. **C. Brittoniana**. Rather stiff, 4 to 6 dm. high, the culm overtopping the leaves: spikes 3 to 5, usually contiguous at the top of the culm, globular and very large (often 2 cm. broad), rusty or whitish-rusty: perigynium very large, the body broader than long (5 to 6 mm. across), broadly winged, and very abruptly contracted into a long, well-defined beak, which is conspicuously spreading and prominently toothed. (*C. Wrightii* Olney, not Dewey. *C. straminea*, var. *maxima* Bailey.)—Damp fields, confined to Texas. Named for Dr. N. L. Britton, who has long insisted that it deserves specific rank.

GRAMINEÆ. (GRASS FAMILY.)

By L. H. DEWEY.

Inflorescence paniculate, racemose, spicate or capitate, bearing the florets in 1 to many-flowered scaly (glumiferous) spikelets: glumes distichous; the lower two empty (rarely 3 or 4 or sometimes reduced to 1 or wanting); the other glumes (*floral glumes*) often similar to the empty ones, bearing in each axil a sessile flower composed of a palet, 2 or 3 minute scales (*lodicules*), 3 stamens, and a simple pistil; these

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